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ABSTRACT

This publication was developed as a basic tool to measure success of Oak Ridge Associated Universities (ORAU) University Programs Division in achieving goals of the Faculty and Student Research Participation Programs operated for the U.S. Department of Energy (DOE). Three questionnaires were created to directly address the goals and objectives of ensuring availability of trained manpower to develop energy resources and improve conservation endeavors. Information was gathered over a 2 year period, evaluated by ORAU's Manpower Education, Research, and Training Division (MERT); and this report was prepared on the basis of the assessment. The 1981/1982 Faculty and Student Research Participation programs provided research opportunities for 86 faculty members and 164 undergraduate students at 12 DOE facilities. The responses to surveys conducted with each group indicate the programs were a rewarding experience for participants and DOE scientists. Further, the programs fulfilled the objectives ORAU determined; in fact, in some cases these objectives were realized by almost 100 percent of the participants. The report contains: participant entry, exit, and follow-up survey results; research collaborator survey results; selected survey data comparisons; program objectives; copies of survey questionnaires; tabled evaluation information; and titles of faculty research participants' publications resulting from this experience. (JM)

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1981 AND 1982 FACULTY AND STUDENT RESEARCH PARTICIPATION PROGRAM EVALUATION

Lee Howard

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1981 AND 1982 FACULTY AND STUDENT RESEARCH PARTICIPATION PROGRAM EVALUATION

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PREFACE

This publication was developed as a basic tool to measure the success of Oak Ridge Associated Universities' (ORAU) University Programs Division in achieving the goals of the Faculty and Student Research Participation Programs operated for the U.S. Department of Energy.

To compile this report, University Programs developed, in collaboration with ORAU's Manpower Education, Research, and Training Division (MERT), three questionnaires which directly addressed the goals and objectives of ensuring the availability of trained manpower to develop new energy resources and to improve conservation endeavors. Information gathered over a two-year period was evaluated by MERT, and this report was prepared on the basis of its assessment.

For those interested in detailed statistical data and estimating methodologies, these materials are included in the introductory materials or in the appendices.

Dr. Alfred Wohlpart
Director, University Programs Division

EXECUTIVE SUMMARY

The Faculty and Student Research Participation Programs provide selected college faculty and undergraduate students (juniors) with the opportunity to participate in research and development at several major installations of the U.S. Department of Energy (DOE). In 1981 and 1982, participants were assigned to the Atmospheric Turbulence and Diffusion Laboratory, Bartlesville Energy Technology Center, Center for Energy and Environment Research, Comparative Animal Research Laboratory, Morgantown Energy Technology Center, Oak Ridge Associated Universities, Oak Ridge National Laboratory, Pittsburgh Energy Technology Center, Pittsburgh Mining Technology Center, Savannah River Ecology Laboratory, Savannah River Laboratory, and Union Carbide Corporation - Nuclear Division.

These programs support the Department of Energy's efforts to ensure the availability of trained manpower to develop new energy resources and to improve conservation endeavors. Participants are given hands-on training in energy-related research areas, often using equipment not available on their campuses. The Student Research Participation Program offers students the opportunity to conduct research in a field of their interest under the guidance of a DOE facility senior staff member. The Faculty Research Participation Program offers faculty members the opportunity to collaborate with DOE scientists on issues which relate to the Department's mission and which have importance in the faculty participant's academic research.

The majority of the appointments are made for a 10-week period during the summer months, although a limited number of appointments are made during the academic year. Since the Faculty Research Participation Program began in 1946, approximately 1,400 faculty members have participated, with an average of 40 appointments made annually. The Student Research Participation Program was initiated in 1958 and has had approximately 2,000 appointments, with recent average assignments of approximately 80 students each year.

Each year the faculty and student research participants are asked to respond to three questionnaires, and their DOE research collaborators/mentors are surveyed once. The purpose of this report is threefold: (1) to describe the results of 1981 and 1982 program surveys; (2) to evaluate the effectiveness of the 1981 and 1982 Faculty and Student Research Programs based on the viewpoints expressed by the participants and the DOE facility staff members

in the surveys; and (3) to evaluate the programs on the basis of the extent to which the survey results reflect that ORAU program objectives were met.

Key Findings

The surveys of the 1981 and 1982 Faculty and Student Research Participation Programs indicated the results listed below.

The majority of the faculty research participants

- Produced publications as a result of the experience
- Were trained in new energy technologies
- Incorporated knowledge gained from the experience into their own research and teaching programs
- Improved their ability to direct student research
- Used equipment not available on their campuses
- Planned to continue energy research and collaboration with DOE staff
- Recommended this program to other interested faculty members

The majority of the DOE facility research collaborators indicated that the faculty research participants

- Provided expertise not available at the facility
- Strengthened the research programs at the facility
- Contributed to additional publications from the facility
- Contributed to the mission of the facility
- Would be a useful contractor for DOE

The majority of the student research participants

- Were provided hands-on experience in a research setting
- Were assigned to an area of research that was their first choice
- Found their research assignment to be valuable and one that matched their interest
- Found the content of their research assignment to be investigative and challenging
- Had an increased desire to attend graduate school as a result of their assignment
- Planned to pursue graduate studies and/or a career in research

The majority of the DOE facility research mentors indicated that the student research participants

- Were superior or above average in their performance
- Benefited the facility research programs
- Strengthened the intellectual climate of the facility research group
- Allowed the DOE staff to move at a faster rate on their research projects

Conclusion

The 1981/1982 Faculty and Student Research Participation Programs provided research opportunities for 86 faculty members and 164 undergraduate students at a dozen DOE facilities. The responses to the four surveys conducted with each group indicate that these programs were a rewarding experience for both the participants and the DOE scientists with whom they worked. Furthermore, the programs fulfilled the objectives that ORAU determined should be met; in fact, in some cases these objectives were realized by almost 100 percent of the participants.

The Faculty and Student Research Participation Programs are an important means of developing essential manpower to address the nation's energy concerns and of providing both students and faculty members the opportunity to conduct energy-related research in their fields of interest. The exchange of expertise between faculty and DOE facility staff leads to new approaches to research problems and the students have the opportunity to work with individuals who are highly qualified in their field of study. The energy-related training realized by the participants, the expertise the facility staff gains from the faculty participants, and the future manpower the student researchers may provide DOE result in a worthwhile and beneficial program for all involved.

INTRODUCTION

The Faculty and Student Research Participation Programs provide selected college faculty and undergraduate students (juniors) with the opportunity to participate in research and development at several major installations of the U.S. Department of Energy. In 1981 and 1982, participants were assigned to the following facilities:

- Atmospheric Turbulence and Diffusion Laboratory
- Bartlesville Energy Technology Center
- Center for Energy and Environment Research
- Comparative Animal Research Laboratory
- Morgantown Energy Technology Center
- Oak Ridge Associated Universities
- Oak Ridge National Laboratory
- Pittsburgh Energy Technology Center
- Pittsburgh Mining Technology Center
- Savannah River Ecology Laboratory
- Savannah River Laboratory
- Union Carbide Corporation - Nuclear Division

These programs support the Department of Energy's efforts to ensure the availability of trained manpower to develop new energy resources and to improve conservation endeavors. Participants are given hands-on training in energy-related research areas, often using equipment not available on their campuses. The Student Research Participation program offers students the opportunity to conduct research in a field of their interest under the guidance of a DOE facility senior staff member. The Faculty Research Participation Program offers faculty members the opportunity to collaborate with DOE scientists on issues which relate to the Department's mission and which have importance in the faculty participant's academic research.

The majority of the appointments are made for a 10-week period during the summer months, although a limited number of appointments are made during the academic year. Selection of student participants is based on scholastic record, aptitude, research interests, and graduate school potential. Faculty participants are selected on their professional qualifications and scientific interests and the availability of facilities at the laboratory matching these qualifications and interests.

Since the Faculty Research Participation Program began in 1946, approximately 1,400 faculty members have participated, with an average of 40 appointments made annually. The Student Research Participation Program

was initiated in 1958 and has had approximately 2,000 appointments, with recent average assignments of approximately 80 students each year. Both programs have been managed since their inception by the University Programs Division of Oak Ridge Associated Universities (ORAU) for the U.S. Department of Energy.

Each year the faculty and student research participants are asked to respond to three questionnaires; one at the point of program entry, another at the point of program exit, and a follow-up questionnaire approximately 6 months after they have completed their program participation. In addition, the faculty research participants' DOE facility research collaborators and the student research participants' research mentors are asked to complete a questionnaire regarding the participants' performance and the program's effectiveness. The data in this report are based on the responses provided by the faculty and student research participants and their research collaborators and research mentors in the eight surveys conducted in 1981 and again in 1982. Copies of these questionnaires are included in Appendix A.

The purpose of this report is threefold: (1) to describe the results of 1981 and 1982 program surveys; (2) to evaluate the effectiveness of the 1981 and 1982 faculty and student research programs based on the viewpoints expressed by the participants and the DOE facility staff members in the surveys; and (3) to evaluate the programs on the basis of the extent to which the survey results reflect that ORAU program objectives were met.

METHODOLOGY

The majority of the questions included in the 1981 and 1982 Faculty and Student Research Participation Program evaluation surveys either required a response of "yes" or "no" or an indication of the respondent's level of agreement or disagreement with a particular statement. In addition, there were a few multiple-choice questions which asked the respondent to choose from a predetermined list of possible responses the answer which best reflected how he/she would complete a given sentence. However, there were also several survey questions which were open-ended and which the respondent answered in his/her own words. These open-ended questions were in reference to the following issues:

- Participants' objectives
- Major value of the program
- Participants' accomplishments
- Areas of expertise participants expect to acquire
- Reason for participant selection
- Impact of program on participants' career goals
- Participants' benefits from program
- Impacts of program on DOE facility staff

Whereas survey results for "yes/no," degree of agreement, and multiple-choice questions were determined by a simple summation of the individual responses, the open-ended questions involved the author's judgment in categorizing the responses into similar groups to be used as units of comparison in the description of the results. Data in this report, which is based on categorized responses rather than a simple arithmetic summation by type of response, are noted as such in the tables in which the data occurs.

1981/1982 FACULTY RESEARCH PARTICIPATION PROGRAM EVALUATION

Entry Survey Results - 1981 and 1982 Faculty Research Participants (FRP)

Description of Survey Instrument. The 1981 and 1982 faculty research participants (FRP) were given a questionnaire at the point of entering the program which requested they supply information in the following five topical areas: Participants' Objectives, Prior Participation and Research Experience, Program Awareness and Participation Support, Participant Benefits, and Student Population Taught by Faculty Research Participants. In 1981, 37 of the 46 faculty research participants (80 percent) responded to the entry questionnaire; and in 1982 31 of 40 participants (78 percent) responded.

Participants' Objectives. The 1981 and 1982 FRPs were asked in an open-ended question to list their objectives for participating in the program. These objectives were to be listed in their order of importance, with space allotted for up to three objectives to be cited (see Methodology section for explanation of how categories of objectives were determined).

As can be seen in Table 1, the primary objective cited by both the 1981 and 1982 FRPs was to conduct research in their field of interest. The second most frequently cited primary objective in both years surveyed was to broaden

their scientific background. Agreement in the ranking of primary objectives cited in 1981 and 1982 ended at this point. The remaining 18 1981 responses were distributed fairly evenly among nine categories and the remaining 13 1982 responses fell into five primary objective categories.

Not only was the opportunity to conduct research in one's area of interest the most frequently cited primary objective, it was also the most commonly listed response of the total objectives cited by the FRPs in 1981 and 1982 without regard to the ranking of importance (Table 2). The ability to broaden one's scientific background was the second most commonly cited overall objective for the 1981 FRPs, as was the case for both years in the indicated primary objectives; however, this position was held by the objective of providing the opportunity to interact with researchers in one's field of interest for the 1982 FRPs.

The majority of the objectives cited by the FRPs in both 1981 and 1982 related to developing research skills and having access to DOE facility equipment and staff expertise. Only 3 percent of the 1981 faculty participants and none of the 1982 FRPs indicated that one of their objectives in participating in the program was to become a better instructor.

Prior Participation and Research Experience. Although almost one-third of the 1981 FRPs had previously participated in the program at the same DOE facility, 62 percent indicated that this appointment represented the first time they had been involved in any research participation program (Table 1). In contrast, over 60 percent of the 1982 FRPs indicated they had previously participated either in the program at this or another DOE facility or in a similar research participation program.

Prior program participation might suggest increased research capabilities, or, in the case of those individuals who had previously worked at the same DOE facility, more indepth research conducted on the same project or in the same subject area. However, a greater percentage (57 percent) of the 1981 FRPs indicated their research assignment was an expansion of present or past work that they pursued on their own than did the 1982 FRP respondents (45 percent), even though a greater number of the 1982 FRPs had prior program participation experience (Table 4). Thus, either through prior program participation or through work pursued independently, it appears that a considerable percentage of both the 1981 and 1982 FRPs had related research experience before they began their

appointments. Furthermore, whether or not the FRPs had prior program experience or research experience in the same subject area, the majority of both the 1981 and 1982 respondents (81 and 87 percent, respectively) indicated they expected to contribute expertise that was not available at the DOE facility where they were assigned.

Program Awareness and Participation Support. The most frequently cited means by which the 1981 and 1982 FRPs became aware of the program was by seeing announcements posted on bulletin boards at their campuses (Table 5). Approximately one-fourth of the 1981 and 1982 FRPs indicated they learned of the program through former program participants, and a considerable number of the 1982 FRPs indicated they were made aware of the program through DOE facility contacts.

Although only 7 percent of the 1981 respondents and 3 percent of the 1982 respondents indicated they had become aware of the program through information supplied to them by the head of their department at their universities, approximately three-fourths of both the 1981 and 1982 FRPs indicated that their department chairmen were supportive of their participation in the program (Table 6). Furthermore, two-thirds of the 1981 and 1982 FRPs indicated they knew members of the DOE facility staff prior to applying for the program. Informal feedback from program participants indicates that having prior contact with the DOE facility personnel results in a more satisfying research experience for both the staff and the FRP. Apparently personal knowledge of a potential participant's interests and expertise often allowed a better match to be made with the facility's research needs.

Participants' Benefits. The majority of the 1981 and 1982 FRPs anticipated that there would be benefits from participating in the program. Specifically, approximately three-fourths of the FRPs indicated they anticipated using equipment at the DOE facility that they did not have access to on campus (Table 7). In addition, almost all the 1981 and 1982 FRPs expected to gain expertise that they currently did not have from participating in the program. Furthermore, 78 percent of the 1981 FRPs and 94 percent of the 1982 FRPs expected to continue to collaborate with the DOE facility staff after their appointments expired.

Student Population Taught by Faculty Research Participants. Both the 1981 and 1982 FRPs indicated they taught a significantly higher number of undergraduate than graduate students. A summation of the approximate number of students taught per academic year resulted in a total of 5,035 undergraduates and 77[illegible] graduates for the 1981 FRPs, and 4,880 undergraduates and 345 graduate students for the 1982 FRPs. The lesser number of graduate students was to be expected since graduate programs are seldom, if ever, as large as undergraduate programs. Approximately half of the FRPs taught between 1 and 25 graduate students in an academic year, whereas one-third of the FRPs taught from 151 to 250 undergraduates in an average academic year (Tables 8 and 9).

The importance of the number of students the FRPs teach in any given academic year is that potentially these students will benefit from the increased expertise and knowledge that the FRP gains through the program, and, as a result, these students can be trained in a manner that more closely meets the needs of DOE.

Exit Survey Results - 1981 and 1982 Faculty Research Participants

Description of Survey. Participants in the Faculty Research Participation Program in 1981 and 1982 were given a questionnaire when their assignments were completed which requested that they provide information on the following seven topical areas: Research Plans and Objectives; Research Experience and Intentions; Research Time, Personnel, Skills, and Equipment; Major Value of Program; Program Recommendations; Housing and Stipend; and Suggestions to Increase Program Effectiveness. In 1981, 33 of 46 FRPs (72 percent) responded to the exit questionnaire, compared to 38 of 40 FRPs (95 percent) responding in 1982.

Research Plans and Objectives. Seventy percent of the 1981 FRPs and almost 75 percent of the 1982 FRPs indicated that their research assignment was planned with their DOE facility contact prior to their appointment (Table 10). Furthermore, only 3 percent of the 1981 FRPs and 8 percent of the 1982 FRPs reported that this prearranged research plan was not followed once their assignment began.

Whether or not research had been planned beforehand or if such a plan had been followed, the vast majority of the 1981 and 1982 respondents felt that the outcome of their appointments was consonant with their expectations and that their original objectives had been fulfilled by their research experience.

Research Experience and Intentions. Approximately two-thirds of the 1981 and 1982 FRPs indicated they were involved in energy research prior to their program appointments; however, an even greater number indicated that they intended to continue research in energy once they returned to campus (Table 11). Furthermore, almost all of the respondents surveyed in both years reported that they intended to pursue additional research in the same general area with which their program appointment had been concerned, although only 36 percent of the 1981 FRPs and 45 percent of the 1982 FRPs had received or expected to receive a grant from the DOE facility to continue their research on campus.

These responses suggest that the majority of the faculty participants had a strong commitment to energy research prior to their appointments and that their program experience intensified that commitment to continue their research in energy areas whether or not they received financial support from DOE.

Research Time, Personnel, Skills, and Equipment. Over 80 percent of the 1981 FRPs and almost 100 percent of the 1982 FRPs agreed that they had accomplished more research during their program appointment than they would have if the time had been spent on campus (Table 12). In addition to accomplishing an increased amount of research, the FRPs, with very few exceptions, felt they had benefited from their interactions with facility personnel. Furthermore, over 75 percent of 1981 FRPs and almost 90 percent of the 1982 FRPs indicated they had learned energy technologies with which they were unfamiliar prior to program participation and the majority of the participants reported that the facility provided them access to equipment they did not have on campus (Table 13).

Increased research time, supportive DOE facility personnel, new learning experiences, and access to new equipment made the program a positive experience for a large proportion of the 1981 and 1982 FRPs.

Major Value of the Program. Both the 1981 and 1982 FRPs most frequently cited the interaction that occurred between academicians and DOE scientists as the major value of the program (Table 14). The second most commonly cited program value in both years surveyed was that the program provided the participants with facilities, the latest equipment, and funds for uninterrupted research. These two program values account for over half of the responses in both 1981 and 1982.

Another frequently cited response in the 1981 survey was that the program provided an opportunity to learn new research methods (18 percent of the total). In contrast, this value represented only 8 percent of the 1982 FRP responses. However, a similar percentage of the 1981 and 1982 FRP responses indicated that one of the major values of the program was that it kept faculty aware of new developments in energy research.

Program Recommendations. Over 90 percent of the 1981 and 1982 FRPs indicated they would recommend a similar research experience for any interested graduate student, and 91 percent of the 1981 FRPs and 100 percent of the 1982 FRPs reported they would recommend this program to interested faculty members (Table 15). These responses further substantiate that the research participation program was a positive experience for the 1981 and 1982 faculty participants, a situation evidenced by the responses to many other questions in the exit survey.

Housing and Stipend. Temporary, short-term housing can be a problem for participants in a program such as this, and could decrease the level of participant satisfaction and program productivity. Although over 50 percent of the 1981 and 1982 faculty participants indicated that this was not the case in their situation, 16 to 18 percent were undecided on the question of satisfaction with housing arrangements. Another 9 to 13 percent reported they were, in fact, dissatisfied with the housing accommodations during their tenure with the program (Table 10).

Although housing was an area of concern for some FRPs, stipends do not appear to have been the source of any problem for most participants. Eighty-one percent of the 1981 FRPs and 92 percent of the 1982 FRPs reported that payment for their assignments had been adequate.

Suggestions to Increase Program Effectiveness. In 1981, 25 percent of those participants who made a suggestion they felt would increase program effectiveness recommended that housing arrangements be improved; however,

this response represents only 5 FRPs out of a total of 33 (Table 17). Furthermore, in 1982 only 2 FRPs indicated that better housing arrangements would increase program effectiveness. Thus, the degree to which housing was a problem to the FRPs is still not certain.

The 1982 FRPs most frequently suggested that arrangements be made for participants to continue their research during future summers or at their universities, a suggestion also stated by 1981 FRPs. Further participant suggestions included announcing appointments earlier and more planning and contact before the appointment began. However, 48 percent of the 1981 FRPs and 40 percent of the 1982 FRPs felt that the program effectively met their needs as it is currently structured and/or had no suggestions to offer.

Research Collaborator Survey Results - 1981 and 1982 Faculty Research Participants

Description of Survey. Six months after the 1981 and 1982 FRPs had completed their assignments, a questionnaire was distributed to the DOE facility staff members who had worked collaboratively with the FRPs during the summer. This questionnaire requested that the research collaborators provide information about the following seven topical areas: Research Collaborator Benefits from the Program, Facility Research Program Benefits from the Participants, Energy Technology Training, Continuing Collaboration with Participants, Major Value of the Program, and Suggestions to Increase Program Effectiveness. Twenty-eight of 46 of the 1981 research collaborators (61 percent), and 22 of 40 of the 1982 research collaborators (55 percent) responded to this survey.

Research Collaborator Benefits from the Program. The 1981 and 1982 research collaborators perceived the Faculty Research Participation Program as beneficial. In general terms, over 90 percent of the research collaborators found the experience to be rewarding (Table 18). More specifically, the majority indicated that they had gained new knowledge as a result of their collaboration with the FRPs, and approximately two-thirds of the research collaborators in both years surveyed reported that the FRPs provided expertise that was not available from any facility staff member.

Further research collaborator benefits were evidenced by the approximately 80 percent who reported their research progressed much more quickly due to the assistance provided by the 1981 and 1982 FRPs, and by the fact that all the

1982 research collaborator respondents and 97 percent of the 1981 respondents indicated they would be willing to supervise another faculty member in the future.

Research Program Benefits from the Participant. Ninety-six percent of the 1981 and 1982 research collaborators reported that the DOE facility research program had benefited from the contributions of the faculty participants (Table 19). Approximately 90 percent of the 1981 and 1982 research collaborators agreed that the FRPs brought creative ideas to the facility and that the intellectual climate of the research group was strengthened by the presence of the faculty participants. In addition, over three-fourths of the research collaborators indicated that contributions from the FRPs would result in additional publications from the facility.

Finally, although around 95 percent of the 1981 and 1982 research collaborators felt that the faculty participants had contributed to accomplishing the mission of the facility, opinion was evenly split concerning whether the faculty member's participation had resulted in an expanded rapport between the facility and the FRP's university in the 1981 survey. However, almost three-fourths of the 1982 research collaborators reported that an expanded rapport between the facility and the FRPs' university was a result of the program.

Participants' Contribution to Facility Research. Almost half of the 1981 research collaborators and two-thirds of the 1982 research collaborators reported that the FRPs contributed to the facility research program by developing background data and/or new experimental data for an ongoing research project (Table 20). Thirteen percent of the 1981 and 7 percent of the 1982 research collaborators stated that the FRPs contributed to either the development of new research procedures or the review of data. The remaining contributions cited were either in initiating new work or a new perspective in the research project or in aiding DOE staff in their research efforts.

Energy Technology Training. Although over two-thirds of the research collaborators in both years surveyed reported that the FRPs had been trained in advanced energy technologies during their facility assignments, approximately one-third of the research collaborators were either undecided or did not agree that such training had taken place (Table 21). A portion of these undecided

and negative responses can be explained by the fact that some research appointments are only indirectly energy-related, and thus would not involve specific energy technology training. Furthermore, the nature of some research assignments, such as computer programming, simply does not warrant advanced energy technology training.

Continuing Collaboration with the Participant. Eighty-six percent of the 1981 and 1982 research collaborators indicated they expected to continue collaborative association with their faculty participants, and over 75 percent of the collaborators agreed that the FRP they had been assigned could be a useful contractor for DOE (Table 22). In further support of this opinion, 50 percent of the 1981 research collaborators and 41 percent of the 1982 research collaborators indicated either they had given or intended to give the faculty participant they had worked with a grant or contract to finish his/her research.

Major Value of the Program. The most frequently cited major program value from the perspective of the 1981 and 1982 research collaborators was that it offered the opportunity for an exchange of methodologies, techniques, and viewpoints between the DOE staff and the faculty participants (Table 23). Another frequently cited value was that the program provided an increased number of trained staff members to work on a project. The majority of the remaining values cited were gains realized by the FRPs in terms of research skills, use of facilities for research, and subject matter for use in the FRPs' academic programs.

Suggestions to Increase Program Effectiveness. Forty percent of the suggestions offered by the 1981 research collaborators fell into the category of renewing appointments for future summers and/or continued interaction with the FRPs (Table 24). In contrast, only 6 percent of the 1982 research collaborators offered this suggestion. The most frequently cited way in which the program could be made more effective, according to the 1982 research collaborators, would be to improve planning and arrangements for the FRP positions. This category included such responses as ensuring that the facility's needs and the FRPs' interests are matched, earlier notification of applicant acceptance, and better planning by facility staff to set up the FRPs' research assignments. Another suggestion offered by the 1982 research collaborators was to arrange an annual meeting for the FRPs to present papers

on their research. Eleven of the 1981 research collaborators and 5 of the 1982 research collaborators found the program to be very effective as it was structured.

Follow-up Survey Results - 1981 and 1982
Faculty Research Participants

Description of Survey. Six months after they had completed the program, the 1981 and 1982 FRPs were sent a follow-up questionnaire which requested information in the following three topical areas: Benefits from Program Participation, Contact with the Facility, and Grant Proposals Resulting from Program Research. Twenty-eight of 46 of the 1981 FRPs (61 percent) and 31 of 40 of the 1982 FRPs (78 percent) responded to the follow-up survey.

Benefits from Program Participation. Over 90 percent of the 1981 and 1982 FRPs agreed that they had incorporated knowledge gained from their program participation into their teaching (Table 25). However, only a little more than one-fifth of the 1981 FRPs indicated that they planned to offer a new course based on the knowledge they acquired through the program. In contrast, almost half of the 1982 FRPs planned to offer a new course based on their research experience.

Although there was some variation in the number of courses that resulted from the program, the research benefits the FRPs acquired through their facility assignments were more clearly defined. Almost 100 percent of the FRPs indicated that they were better prepared to direct student research as a result of their program participation, and 68 percent of the 1981 FRPs and 84 percent of the 1982 FRPs either had already or were planning to initiate a new research program related to the work they had done during their program appointment (Table 26).

Contact with the Facility. All of the 1982 FRPs and almost 90 percent of the 1981 FRPs reported they had maintained contact with the facility since they had returned to their campuses (Table 27). Furthermore, the large majority of the FRPs indicated that they either were currently or intended to continue collaborating with the DOE facility on the research they conducted during their assignment.

Grant Assignments Resulting From Program Research. Between 82 and 87 percent of the FRPs reported that the research they conducted was of value in preparing grant proposals (Table 28). However, almost two-thirds of the

1981 FRPs compared to just over one-third of the 1982 FRPs had actually submitted or were planning to submit a grant proposal based on their DOE research. Two-thirds of the 1981 proposals and half of the 1982 proposals were submitted to DOE, and another one-fifth to one-third of the proposals were submitted to the National Science Foundation.

Selected Survey Data Comparisons - 1981 and 1982 Faculty Research Participation Programs

In some instances, information about the same subject area was requested on the entry, exit, research, collaborator, and/or follow-up questionnaires. The FRPs were asked about various program expectations at the point of entering the program and asked if these expectations had been realized when they exited the program. Also, questions regarding the program's value and effectiveness were asked of both faculty participants and research collaborators. The subject areas which were cross-referenced in the different surveys are as follows: (1) Use of Equipment, (2) Participants' Expertise, (3) Energy Technology Training, (4) Major Program Value, (5) Suggestions to Increase Program Effectiveness, and (6) Research Support and Collaboration. A comparison of the responses given in these subject areas can serve as a means of evaluating both the degree of agreement between FRPs' expectations and experiences and the perceptions regarding program performance held by participants and their research collaborators. Please note that all results reflected in this section are based on data included in Tables 1-28.

Use of Equipment. At the point of entering the program, 76 percent of the 1981 FRPs and 74 percent of the 1982 FRPs indicated they expected to use facility equipment which they did not have access to on campus; however, only 60 percent of the 1981 FRPs indicated on the exit questionnaire that, in fact, they had had access to such equipment at the DOE facility. The margin of difference between expectation and experience was much less for the 1982 FRPs, with 71 percent reporting they had used equipment not available on their campuses when surveyed at the completion of their appointment.

Participants' Expertise. The FRPs were also queried at the time they began their appointments as to whether they expected to contribute expertise that was not available at the facility. Eighty-one percent of the 1981 faculty

participants and 87 percent of the 1982 FRPs responded "yes" to this question; however, approximately 67 percent of the research collaborators agreed that the FRPs assigned to their projects had actually contributed expertise that was not available at the DOE facility. The discrepancy between the FRPs' expectations and their research collaborators' perceptions can possibly be explained by the FRPs lack of awareness at the point of entering the program that there were DOE staff members who shared their area of expertise.

Energy Technology Training. The FRPs were asked at the point of completion of the program if they had learned energy technologies which were unfamiliar to them prior to program participation, and the research collaborators were asked if the FRPs had been trained in advanced energy technologies while at the facility. Seventy-eight percent of the 1981 FRPs and 87 percent of the 1982 FRPs agreed they had learned previously unfamiliar energy technologies during their appointments, compared to 68 percent of the 1981 research collaborators and 72 percent of the 1982 research collaborators who felt that advanced energy technologies had been a part of the FRPs' training.

It should be noted that the questions asked of the two groups were not identical. The FRPs might, in fact, have learned energy technologies which were unfamiliar to them but which the research collaborators did not perceive as advanced, or perhaps the research collaborators did not perceive the appointment as having a formal training component in advanced energy technologies. Nonetheless, a 10- to 15-percent variation in the response supplied by the two groups is not a wide margin of disagreement.

Major Program Value. Both the 1981 and 1982 FRPs and research collaborators were asked what they thought was the major value of the program. The most frequently cited faculty responses fell into the category of "interaction between academicians and DOE scientists," and the most commonly cited research collaborator response was "exchange of methodologies, techniques, and viewpoints." Both responses refer to a similar idea, i.e., that the program provides an opportunity for an interaction that leads to an exchange of research skills and knowledge.

In general, there is agreement between the FRPs and research collaborators as to what the major program values are, although the percentage of responses aligned with any given value differs between the two groups. In 1981, both

faculty participants and research collaborators indicated that facilities and equipment for the FRPs' use was a major program value; however, 20 to 23 percent of the FRPs cited this response compared to 4 to 6 percent of the collaborators. This range of difference was to be expected since the faculty participants would be oriented more toward those values which met their research needs and the research collaborators would be more oriented toward those program values which met the needs of the project and the DOE facility. In fact, around one-fifth of the 1981 research collaborators' responses cited the major program value to be the availability of an increased number of trained staff members, a value not likely to be a perspective held by the FRPs who have neither a long-term commitment to the project nor any management concerns.

Suggestions to Increase Program Effectiveness. The 1981 and 1982 FRPs and research collaborators also were asked for suggestions that would increase program effectiveness. Although the research collaborators and the FRPs often offered similar recommendations, the frequency in which suggestions were cited varies both between the FRPs and the research collaborators and between the two survey years. The 1981 research collaborators and the 1982 FRPs most frequently suggested that appointments should be renewed for future summers or that some other means of continued interaction between the FRPs and the DOE staff should be implemented. In contrast, this suggestion was offered by only 6 percent of the 1982 research collaborators and 15 percent of the 1981 FRPs.

The most frequently cited suggestion offered by the 1981 FRPs was that housing arrangements should be improved, a suggestion not mentioned by the 1981 or 1982 research collaborators. However, as was discussed earlier in the major values cited by both groups, the concerns of the research collaborators and faculty participants would not necessarily be the same. Overall, the research collaborators offered suggestions which would lead to longer and/or better planned appointments for a more widely qualified and larger group of FRPs. While the 1981 faculty research participants' suggestions addressed a need for longer appointments, they also voiced a concern for better preparations and services which would enhance their research experience.

Research Support and Collaboration. When the 1981 faculty research participants were asked at the time they completed their appointments

whether they expected to receive a grant or contract from the DOE facility for work on their campuses, 36 percent of the 1981 FRPs and 45 percent of the 1982 FRPs reported that they anticipated such funding. However, 6 months later the number of 1981 FRPs who reported they had submitted or planned to submit a grant proposal had increased to 64 percent of the total. In contrast, the 1982 FRPs' response in the follow-up survey showed a 6 percent decrease from the exit survey indication of the expectation of funding. These figures suggest that even though many of the 1981 FRPs may not have anticipated funding at the end of their appointments, they were actively pursuing such funding to continue their research 6 months later. One-half to two-thirds of these grant proposals were submitted to DOE, and approximately half of the 1981 and 1982 DOE facility research collaborators reported that they either had given or were planning to give the FRPs a grant or contract to continue their research on campus.

Although not all the DOE facilities were able to continue funding of the FRPs' research, 86 percent of the 1981 and 1982 research collaborators expected to continue a collaborative association with the participants. The intention of a continued collaborative association was also affirmed by over three-fourths of the 1981 FRPs and almost all of the 1982 FRPs in both the entry and follow-up surveys.

Finally, these comparisons between the surveys indicate a general agreement between the FRPs and their research collaborators on several important issues. The FRPs' expectations at point of entry were realized through their program participation, and the DOE facility research collaborators had access to trained personnel who not only provided project assistance but also new perspectives on the research in progress.

Program Objectives - Faculty Research Participation Program

The University Programs Division of Oak Ridge Associated Universities, which administers the Faculty Research Participation Program for the U.S. Department of Energy, has outlined a set of objectives which the program is designed to realize for both the faculty research participants and the participating DOE facilities. This section of the report will examine the degree to which the 1981 and 1982 Faculty Research Participation Program

evaluation survey responses indicate that these objectives were met. Results are based on data included in Tables 1-28.

Program Objectives for Faculty Research Participants. The first program objective is to provide research participation opportunities for faculty members in ongoing energy research. This objective is met simply through the existence of the Faculty Research Participation Program and the DOE facility appointments that result from the program.

With 78 percent of the 1981 FRPs and 87 percent of the 1982 FRPs indicating they had learned energy technologies unfamiliar to them prior to program participation, the ORAU/DOE objective of training faculty in up-to-date energy technologies was realized in large part in both years surveyed.

Over 90 percent of the 1981 and 1982 faculty participants indicated they intended to pursue additional research in the same areas as their research program assignment, and 68 to 84 percent of the FRPs reported they had initiated or were planning to initiate a new research program related to the research they conducted at the DOE facility. These responses indicate that the program objective of incorporating new knowledge gained through the program into the faculty members' own research programs has been met.

The fourth program objective of providing the opportunity to propose and conduct research which is responsive to the needs of DOE appears to be met in part by the fact that approximately 40 to 60 percent of the 1981/1982 FRPs reported they had submitted or were intending to submit grant proposals as a result of their research at the DOE facility. Over three-fourths of the 1981 FRPs and almost all of the 1982 FRPs indicated they intended to continue collaborative research with the DOE facility where they had been assigned.

Although only 22 to 45 percent of the FRPs indicated that they planned to offer a new course based on knowledge gained through the program, almost all reported they had incorporated knowledge gained through program participation into their teaching. This latter response affirms that the objective of incorporating new knowledge into the faculty's teaching program has been realized.

The program objective of providing the opportunity to focus on a research agenda with none of the distractions of classroom, office, or administrative duties was affirmed by 82 percent of the 1981 FRPs and 97 percent of the

1982 FRPs. They reported that being away from their universities had allowed them to conduct more research than they would have if the time had been spent on campus. Furthermore, the second most frequently cited major program value by both 1981 and 1982 FRPs was that the program provided the facilities, equipment, and funds for uninterrupted research.

Given that a total of 75 or more actual publications (journal articles, proceedings, and/or DOE reports) were cited by the 1981 and 1982 FRPs as a result of their appointments, the ORAU/DOE objective to provide the opportunity for faculty to have their research published was realized by the 1981 and 1982 programs (See Appendix B for a list of publications).

Finally, the last program objective for the faculty participants is to provide the opportunity to train students more closely to DOE needs. With just under 100 percent of the 1981 and 1982 FRPs reporting they were better prepared to direct student research in areas related to their program appointments, this goal was obviously met.

Program Objectives for Participating Facilities. The first objective for the participating facilities involved in the Faculty Research Participation Program is to provide the beginnings for future or collaborative research. This goal was affirmed by 86 percent of the 1981 and 1982 research collaborators, who indicated they expected to continue cooperative research efforts with the faculty participants.

Almost 100 percent of the 1981 and 1982 research collaborators indicated that their research programs had benefited from the contributions of the faculty participants, which supports the conclusion that the objective of strengthening the research programs at the facilities was realized. Furthermore, the majority of the research collaborators affirmed that the program objective of strengthening the intellectual climate at the facilities through the interaction of DOE and the faculty participants was also met.

Another program objective for the facilities is to train potential manpower in advanced energy technologies, a goal that 68 percent of the 1981 research collaborators indicated was realized.

Over three-fourths of the 1981 and 1982 research collaborators reported that additional published research from the facility had resulted from the contributions of the FRPs, thus affirming another program objective. However,

half of the 1981 research collaborators were in agreement and the other half were undecided about whether the objective of the expanded rapport between the FRPs' universities and the DOE facilities had actually occurred as a result of the program. The 1982 research collaborators were in greater agreement that the program had expanded rapport between the academic sphere and DOE, with almost three-quarters of the respondents affirming this statement and the remainder undecided.

Almost 100 percent of the 1981 and 1982 research collaborators agreed that the faculty participants had contributed to the mission of the DOE facility through the research they had conducted during their appointments, and approximately half of the collaborators reported they had given or intended to give a grant to the FRPs to continue their research efforts. It should be noted that budget restrictions were cited by almost 30 percent of the 1981 research collaborators as the reason they would not be funding the FRPs' continued research, rather than a decision that the research was inappropriate for DOE or a question of the FRPs' expertise. These responses support the fact that the program objective of encouraging research responsive to the needs of DOE certainly was met during the 1981 FRPs' appointments, and, to a large extent, this objective continued to be realized even after the completion of the faculty appointments through facility funding of research efforts on campus.

Finally, with approximately two-thirds of the 1981 and 1982 research collaborators in agreement that the FRPs had contributed expertise not available from the present staff, the last facility objective was met in large part through the Faculty Research Participation Program.

1981 AND 1982 STUDENT RESEARCH PARTICIPATION PROGRAM EVALUATION

Entry Survey Results - 1981 and 1982
Student Research Participants (SRP)

Description of Survey. The student research participants in 1981 and 1982 were requested at the point of entering the program to provide information regarding the following four topical areas: Participants' Objectives, Means of Program Awareness, Participants' Expectations and Program Preparation, and Areas of Expertise Participants Expect to Gain from the Program. Only 38 of the total 88 SRPs (43 percent) in 1981 responded to the entry survey; however, 74 of the 76 SRPs (97 percent) responded in 1982.

Participants' Objectives. The student research participants were asked to list their objectives for participating in the program. These objectives were to be listed in their order of importance with space allotted on the questionnaire for up to three purposes to be listed. Individual responses were grouped into like categories by the author.

As can be seen in Table 29, over half of the 1981 SRPs and almost two-thirds of the 1982 SRPs indicated that their primary objective in participating in the program was to gain research experience. Although the majority of the responses was included in this objective, several 1981 and 1982 SRPs indicated their primary objective in participating in the program was to gain further knowledge in their field. In addition, 11 percent of the 1981 SRP primary objectives fell into the category of assistance in making career decisions, and the same percentage of 1982 SRP respondents listed their primary objective in participating in the program was to gain hands-on laboratory experience.

As was the case in the SRPs' primary objective, the opportunity to gain research experience was almost the most frequently cited overall objective, regardless of ranking of importance for both years surveyed (Table 30). The second most commonly cited overall program objective for both 1981 and 1982 SRPs was to gain further knowledge in their field (18 and 14 percent, respectively). Another frequently cited objective was to gain assistance in making career decisions. Although similar objectives were cited by the 1981 and 1982 SRPs, the percentage of the total responses a given objective represents differs in many instances. For example, almost 10 percent of the 1982 SRPs reported an objective in participating in the program was to have summer employment, compared to 3 percent of the 1981 responses in this

years was concerned with experiencing the nonacademic world and gaining research skills.

Means of Program Awareness. The 1981 and 1982 SRPs most frequently indicated that they became aware of the program through literature posted on their campus bulletin boards (Table 31). Almost one-fourth of the responses in both years, however, indicated that the students had been informed of the program by their major professors. Former participants and department chairmen were also sources of information about the program; however, journal advertisements reached only one student in each of the two years surveyed.

Participants' Expectations and Program Preparation. Thirty-nine percent of the 1981 SRPs and 45 percent of the 1982 SRPs had talked to either a former student or faculty program participant and, as a result, had some idea of what to expect from their program assignments (Table 32). However, only 5 percent of the 1981 SRPs and 16 percent of the 1982 SRPs knew any members of the DOE facility staff prior to being selected for the program. Not only would contacts at the facility better inform the students what to expect from a given program assignment, informal feedback suggests that student participants who are selected for an assignment because a facility staff member is personnally aware of his/her interests and skills often have more satisfying research experiences.

Close to two-thirds of the 1981 and 1982 student research participants reported that their research assignment was in an area in which they were primarily interested. Students whose assignments were in topics of their first choice would no doubt be better satisfied with their work and possibly would have a stronger background in an area of primary interest.

In terms of actual preparation efforts made by the facility staff, 71 percent of the 1981 SRPs and 64 percent of the 1982 SRPs reported that their research mentor had contacted them prior to the beginning of their assignment and informed them of the nature of the research they would be conducting (Table 33). However, this contact included a specific work plan and reading references for only 37 percent of the 1981 SRPs and 46 percent of the 1982 student participants.

Areas of Expertise Participants Expect to Gain from the Program. Less than half of the 1981 SRP responses and half of those reported in 1982 cited an expectation to gain expertise in research and research techniques (Table 34). In 1981, the student research participants' second most frequently cited response was that they expected to gain expertise in their major subject, whereas in 1982 the students more frequently cited an expectation to gain expertise in the use of equipment through their program participation. Other areas in which the SRPs hoped to gain expertise included practical applications, independent work, and writing and/or publishing.

Exit Survey Results - 1981 and 1982 Student Research Participants

Description of Survey. At the end of their summer research assignments, the 1981 and 1982 SRPs were requested to provide information regarding the following eight topical areas: Program Preparation, Assistance in Meeting Program Requirements, Satisfaction with Assignment, Housing and Transportation, Program Impacts, Future Plans, Major Value of the Program, and Suggestions to Increase Program Effectiveness. Eighty-five of 88 of the 1981 SRPs (97 percent) and 74 of 76 of the 1982 SRPs (97 percent) responded to the exit survey.

Program Preparation. Although 56 to 59 percent of the 1981 and 1982 SRPs reported that their research supervisors had actually contacted them prior to their arrival, almost 100 percent of the participants in both years surveyed felt that research supervisors should contact students and provide them with written material prior to the beginning of their assignment (Table 35).

In addition to the preparation provided by the DOE facility research supervisors, the majority of 1981 and 1982 student participants agreed that their academic preparation had been adequate for meeting the requirements of the research assignment (86 and 88 percent, respectively).

Assistance in Meeting Program Requirements. Approximately 90 percent of the 1981 and 1982 student participants agreed that their supervisors were available to guide or assist them in the laboratory (Table 36).

Although around half of the 1981 and 1982 SRPs felt the orientation session had been beneficial, one-fifth of the SRPs did not find the session

to be of value. Nonetheless, 90 to 92 percent of the 1981 and 1982 student participants found the information and equipment at their disposal to be adequate to carry out their research assignments.

Satisfaction with Assignment. Almost all of the SRPs in both years surveyed indicated that their research experience had been personally valuable (Table 37). Furthermore, over half of the 1981 and 1982 SRPs reported that their research experience had exceeded their expectations, and three-fourths of the SRPs indicated that their assignments had matched their interests.

The generally high degree of satisfaction with their assignments is further reflected in the 74 to 82 percent of the 1981 and 1982 SRPs who found the content of their assignments to be investigative and challenging, while only 10 and 16 percent, respectively, felt that their assignments were sometimes boring.

Housing and Transportation. Sixteen to 21 percent of the 1981 and 1982 SRPs felt that housing arrangements served as a major drawback in considering program acceptance, although a lesser percentage felt that housing was a more difficult issue than one would expect for a short-term stay in any location (Table 38).

Close to 60 percent of the students in both years surveyed felt that ORAU had been frank about the housing situation from the beginning of the offer, and approximately 50 percent of the SRPs indicated that communications from ORAU regarding housing had minimized problems actually encountered. In addition, two-thirds of the 1981 student research participants and over half of the 1982 SRPs indicated that transportation was less of a problem than they had anticipated. It should be noted, however, that an average of approximately one-fifth to one-quarter, respectively, of the student respondents were undecided on housing and transportation issues.

Program Impacts. Forty-four percent of the 1981 student participants and 62 percent of the 1982 student participants agreed that the training they had received through the program had provided them with an indepth background for a major senior or honors course or paper (Table 39). Not only did a large proportion of the student participants feel that the program had benefited their present educational pursuits, over half of the 1981 SRPs and two-thirds of the 1982 SRPs indicated that their assignment had increased their desire to

go to graduate school. Furthermore, 40 to 50 percent of all the SRPs reported that their participation in the program had led them to consider a career with DOE.

Future Plans. Less than 10 percent of the 1981 and 1982 student participants reported that they intended to start careers when they had completed their undergraduate degree programs (Table 40). Instead, the majority indicated that they planned to go to graduate school, with approximately one-third of the SRPs reporting they would pursue graduate study in an energy-related area.

Over half of the SRPs in both years surveyed reported they intended to pursue a Ph.D. in graduate school, while approximately one-fifth of the SRPs intended to cease formal education at the M.S. level (Table 41).

Major Value of the Program. The most frequently cited major program value for both the 1981 and 1982 SRPs was the research experience it provided (Table 42). The second most commonly cited major program value for both years surveyed was the exposure the program provided to scientific research outside the academic setting. The two groups of students also frequently indicated that the association with people well versed in their fields and the opportunity to consider career possibilities in research were primary advantages provided by the program.

Suggestions to Increase Program Effectiveness. Of the suggestions offered by the 1981 and 1982 SRPs to increase program effectiveness, the majority were grouped into the category of "Increased communication prior to student's arrival." Another frequently cited suggestion by the 1981 and 1982 SRPs was that ORAU should increase supervision over the participating facilities in the future to ensure there will actually be research for the student to conduct.

Other suggestions were concerned with better information about the research projects and more communication with other student participants. Finally, given the mixed responses to questions concerning housing and transportation which were discussed earlier in this report, it is not surprising that 17 percent of the 1982 SRPs' and 9 percent of the 1981 SRPs suggestions were that housing and transportation arrangements should be improved.

Research Mentor Survey Results - 1981 and 1982
Student Research Participants

Description of Survey. At the end of the SRPs' assignments, questionnaires were distributed to the students' research mentors requesting information about the following 10 topical areas: Preparation Provided for the Research Mentors, Preparation Made for Program Participants, Reasons for Participant Selection, Satisfaction with Participants, Influence of Research Program on Students' Attitudes Toward Research or Career Goals, Student Benefits from Research Assignment, Research Mentor Benefits from the Program, Program Impacts on Facility Staff, Facility Research Program Benefits from the Participants, Major Value of the Program, and Suggestions to Increase Effectiveness. Seventy-nine of 88 of the 1981 research mentors (90 percent) and 58 of 76 of the 1982 research mentors (76 percent) responded to this survey.

Preparation Provided for the Research Mentor. As can be seen in Table 44, the majority of the research mentors in both years surveyed felt they were well prepared to serve in their supervisory capacity with the program. Ninety to 97 percent of the research mentors indicated they understood what their duties would entail, and over 80 percent were satisfied with the information provided by ORAU prior to the students' arrival.

A further reflection of the success of efforts made to aid the research mentors in their preparation for the student research participants was the fact that approximately two-thirds of the research mentors reported that they were notified of their student assignment 2 to 3 months in advance (Table 45). In addition, 86 to 91 percent received a copy of the student's file prior to the SRP's arrival. These factors would all suggest that the majority of the research mentors had an adequate amount of information and time to make the necessary arrangements for a satisfactory placement of the students in the facilities' research projects.

Preparation Made for Program Participants. Approximately two-thirds of the 1981 and 1982 research mentors reported they had contacted their student research participants regarding the general nature of their research assignment prior to their arrival (Table 46). However, only 56 percent of the 1981 research mentors indicated they had provided a specific work plan and reading references to the SRPs prior to the program starting date. On the other hand, a slightly greater percentage of the 1982 research mentors provided the SRPs with specific assignment information rather than more general information.

Reasons for Participant Selection. A student's academic record and background in the subject area of the research project were the most frequently cited considerations for participant selection for both the 1981 and 1982 research mentors (Table 47). A student's indicated interest on his/her application and the recommendations the student's professors presented were other commonly cited reasons for selection of a particular student.

It should be noted that 8 of the 1981 research mentors and 5 of the 1982 research mentors supervised students who were selected for the assignment by other facility personnel.

Satisfaction with Participants. Over 90 percent of both the 1981 and 1982 research mentors reported that the student participants they selected matched the quality suggested in their applications (Table 48). Furthermore, of the 1981 and 1982 research mentors who had prior experience supervising student participants, over half found the work of the students currently assigned to be superior to work done by previous student research participants.

Another measure of satisfaction with the student research participants was reflected in the performance ratings provided by the research mentors. Approximately 50 percent felt the SRPs assigned to their projects performed their duties in a superior manner, and another 38 to 40 percent indicated their SRPs' work performance was above average (Table 49). Only 2 of 79 of the 1981 research mentors found the students' performance to be below average, and none of the 1982 research mentors reported the SRPs' work to be below average.

Influence of Research Experience on Students' Attitudes Toward Research or Career Goals. Approximately half of the 1981 and 1982 research mentors felt that the research assignment had influenced the student participants' attitudes toward research or career goals (Table 50). Specifically, 52 percent of the 1981 research mentors who perceived an impact on the students' attitudes indicated that the SRPs were now planning to pursue graduate school and/or a career in the area of their research assignments. This same response was reported by 36 percent of the 1982 research mentors; however, an equal number of the 1982 mentors felt that the nature of the

program's influence had been the students' development of additional research or technical skills. Approximately one-fifth of the research mentors who cited evidence of program impacts in both years reported the SRPs under their supervision had developed a more intense interest in research.

Student Benefits from Research Assignment. Eighty-three percent of the student research participants' benefits cited by the 1981 research mentors and 86 percent of the SRP benefits cited by the 1982 research mentors fall into the following four categories: (1) experience working in a research environment, (2) use of equipment and techniques not available on campus, (3) more detailed knowledge and skill in the specific subject studied, and (4) the application of knowledge learned in an academic setting (Table 51).

Opinion was fairly evenly split among the research mentors concerning whether the students had received the benefit of training in advanced energy technologies, with a slightly higher percentage of 1981 mentors agreeing rather than disagreeing that such training had occurred. Just the opposite situation occurred among the 1982 research mentors (Table 52).

Research Mentor Benefits from the Program. Close to 90 percent of the 1981 and 1982 research mentors found their experience of supervising the SRPs to be rewarding (Table 53). More specifically, the majority of the research mentors in both years surveyed felt they had gained teaching and administrative skills from supervising the student participants. Furthermore, 85 percent of the 1981 and 1982 research mentors reported that their research had progressed at a faster rate due to the assistance of the students, and almost 100 percent of the mentors indicated they would be willing to supervise another student in the future.

Program Impacts on Facility Staff. Beyond the benefits the research mentors felt they had specifically gained, they also reported benefits that were provided to other facility staff members through the program. Somewhat over one-third of the 1981 and 1982 research mentors reported that the students' efforts allowed the facility staff to complete or get nearer to completion on a current project (Table 54). Other program impacts on the facility staff included the ability for the staff to pursue research in new areas due to the students' assistance, the positive effect of the students' enthusiasm on the rest of the group, and new insights provided by the students

regarding the research work at hand. All of the impacts cited were of a positive nature, except for two research mentors in 1982 who reported that student participants had a negative effect in the research group due to the amount of time required to supervise and train them.

Facility Research Program Benefits from the Participant. In general terms, over 90 percent of the 1981 and 1982 research mentors felt that the research program at their facility had benefited from the contributions of the SRPs (Table 55). In specific terms, however, the mentors were more divided in their opinions regarding the contributions of the students. Less than half of the 1981 and 1982 research mentors thought that the students had brought new ideas and approaches to the research group, and only slightly over half of the mentors thought that the intellectual climate of the group had been strengthened by the student participants. Given the difference in the level of experience and education between the students and the facility staff, these numbers nonetheless indicate an impressive impact by the SRPs. The most concrete evidence of the students' contribution to the facilities' research programs, however, is reflected in the fact that 39 to 40 percent of the research mentors reported that the students' efforts had resulted in additional publications from their facilities.

Major Value of the Program. The most frequently cited major program values by the research mentors in both years surveyed were the practical research experience the program provides the students and the opportunity the students have to consider what research careers in their fields would entail (Table 56). Several of the research mentors indicated that the interaction between the professionals and students was a major program value, although this response was cited more frequently in 1981 than 1982.

Other cited major program values are concerned primarily with the teaching opportunities provided to the research mentors and the research and training experiences offered to the student participants.

Suggestions to Increase Program Effectiveness. The majority of the suggestions offered by the 1981 research mentors fall into the category of extending the length of the SRP appointment or allowing students to return in future summers (Table 57). This response was also offered by the 1982 research mentors, but they suggested an equal number of times that there should be contact with the students prior to the beginning of their assignments.

Other research mentor suggestions were of the nature of better and earlier program preparation and assisting the students in housing arrangements; however, 44 percent of the 1981 research mentors and 48 percent of the 1982 research mentors found the program effective as currently structured and/or had no suggestions to offer.

Follow-Up Survey Results - 1981 Student Research Participants

Description of Survey. Six months after the 1981 and 1982 SRPs had completed their assignments, a short follow-up questionnaire was distributed requesting they provide information regarding their publications and seminars and the impact of the program on their career goals. Thirty-three of 88 of the 1981 SRPs (38 percent) and 30 of 74 of the 1982 SRPs (41 percent) responded to this survey.

Publications and Seminars. Only 21 percent of the 1981 and 30 percent of the 1982 SRPs reported that they had authored, co-authored, or had their assistance acknowledged in a scientific publication as a result of their participation in the program; however, 50 to 61 percent reported that they had presented a seminar (Table 58).

Impact of Program on Career Goals. Thirty percent of the 1981 SRPs and 13 percent of the 1982 SRPs indicated that as a result of their participation in the program they intended to pursue a career in research, and another 7 percent of the 1982 SRPs reported they had already accepted a position in a research laboratory. Approximately one-third to one-half of the SRPs reported they intended to enter graduate school to study in the same subject area as their program assignment. The majority of the SRP responses were positive, with only a few respondents indicating they had chosen not to pursue a career in research as a result of their program experience.

Selected Survey Data Comparisons - 1981 and 1982 Student Research Participants

The 1981 and 1982 Student Research Participation Program evaluation surveys requested information about the same subject area in several instances on the entry, exit, research mentor and follow-up questionnaires. The subject areas which were cross-referenced in the different surveys include: (1) Communication with the Research Mentor Prior to Program Assignment, (2) Major

Program Values, (3) Suggestions to Increase Program Effectiveness, and (4) Program Impact on Career Goals. A comparison of responses given in these subject areas can serve as a means of evaluating the degree to which student program expectations were met and as a measure of agreement between student and facility staff perceptions of the program.

Although there was only an approximate response rate of 40 percent for the 1981 SRP entry survey and the 1981 and 1982 SRP follow-up survey, these responses are used in the data comparisons for the purpose of assessing a general trend. However, comparisons made with these three surveys' results should be viewed with caution. All other 1981 and 1982 SRP surveys had comparable response rates. Results discussed in this section are based on data included in Tables 29-59.

Communication with Research Mentors Prior to Program Assignment. Seventy-one percent of the 1981 student participants indicated at the point of entering the program that they had been contacted by their research mentors regarding their assignment, a situation which was affirmed by a close 67 percent of the 1981 research mentors. However, only 56 percent of the 1981 SRPs reported prior contact with the research mentor at the point of program exit. Sixty-four percent of both 1982 SRPs entering the program and their research mentors agreed that prior contact had occurred, and 59 percent of the 1982 student participants affirmed on the exit questionnaire that they had communicated with their mentors prior to beginning their program assignment.

Although there was basic agreement among the survey responses regarding general communication between students and mentors prior to their program assignments, this is not the case when comparing responses to the question of whether a specific work plan and reading references were provided by the research mentor before the program began. Thirty-seven percent of the 1981 SRPs indicated such assignment specifics had been sent to them prior to starting their research in the program compared to 56 percent of the 1981 research mentors who reported providing a work plan and references to the students before the starting date. This may be explained by the differences in the number of 1981 SRP entry survey and research mentor survey respondents. However, in 1982, where the differences in the response rates are much smaller, 46 percent of the SRPs reported receiving a work plan and reading references prior to the starting date compared to 69 percent of the research mentors who

reported they provided these materials. Regardless of whether such contact and written materials had been provided or not, almost 100 percent of the 1981 and 1982 SRPs felt that such provisions should be made.

Major Program Value. The most frequently cited major program value from the perspective of both the 1981 and 1982 student participants and their research mentors was that the program provided the students with research experience. In addition, both the students and their research mentors felt that exposure to research in a nonacademic environment was a major value of the program, although the students gave this response more frequently than the research mentors. However, the opportunity to see what a research career would entail was a value cited almost equally by the 1981 and 1982 students and their research mentors.

The remaining program values cited by the students were primarily concerned with gaining research skills, whereas the research mentors often indicated values oriented more toward gaining teaching skills. This difference of perspective is appropriate given the roles of the two groups.

Suggestions to Improve Program Effectiveness. There was very little agreement between the 1981 and 1982 student participants and research mentors as to what changes should be made to improve the program's effectiveness. However, given the students' and supervisors' different concerns with the program, one would not expect a high level of agreement. From the supervisory point of view, the research mentors' major concerns were with the quality and quantity of work the program could aid them in accomplishing in their research projects. As a result, their suggestions in large part were to extend the length of the program, to ensure that assignments matched student interests and skills, and to provide more participants. On the other hand, the student participants were primarily concerned that the program be structured in such a way that they were prepared for their research assignments and that there be adequate research for them to conduct. Of course, there was some overlap in the suggestions offered by the two groups, but the frequency with which a given suggestion was cited differs. However, both research mentors and students expressed a need for contact before the assignment starting date and for better housing arrangements to be made for the students.

Program Impact on Career Goals. There is basic agreement among the survey respondents regarding the program's impact on the students' career goals. Fifty-seven to 66 percent of the student research participants indicated at the end of their research assignments that their program experience had increased their desire to go to graduate school.

One-third to one-half of the SRPs reported in the follow-up survey that not only did they intend to go to graduate school, but that they also intended to pursue their studies in the same subject area as their research assignment. Another 37 to 43 percent of the SRPs reported in the exit survey that as a result of their assignments they might consider a career with DOE. In fact, 6 months after their program exit, 7 percent of the 1982 SRPs had accepted a position in a research laboratory. The research mentors were basically in agreement that the program made an impact on the SRPs career goals, with one-third to one-half reporting the students' increased interest in the subject matter and/or research.

Finally, these comparisons show a general agreement among the surveys. Although there was some disagreement in the student and research mentor responses, the majority of differences were appropriate given the different roles of students and mentors within the program. Overall, the responses from the individual surveys and the comparisons made in this section reflected a program which was perceived as successful for both 1981 and 1982 students and mentors.

Program Objectives - Student Research Participation Program

The University Programs Division of Oak Ridge Associated Universities, which administers the Student Research Program for the U.S. Department of Energy, has outlined a set of objectives which the program is designed to realize for both the student research participants and the participating DOE facilities. This section of the report will examine the degree to which the 1981 and 1982 Student Research Participation Program evaluation survey indicates that these objectives were met. Results discussed in the following paragraphs are based on data included in Tables 29-59.

Program Objectives for Student Research Participants. The first program objective for the student participants is to provide research participation opportunities for students in ongoing energy research. This goal is met simply through the existence of the Student Research Participation Program and the student assignments which were made at DOE facilities during 1981 and 1982 as a result of the program.

The second program objective of complementing educational programs as an extension of the classroom environment appears to have been met in part in 1981, with 44 percent of the SRPs indicating they received an indepth background from their training which they would use in a senior or honors course or paper. This objective was met to a greater extent in 1982, when 63 percent of the students reported that the program had provided them with such a background.

Over 60 percent of the major program values cited by the 1981 and 1982 student research participants were concerned with gaining research and laboratory experience at DOE facilities. This suggests that the objective of providing the students with hands-on laboratory experience was realized by a majority of the participants. Further support that this objective was met is reflected by the fact that 83 to 90 percent of the benefits the 1981 and 1982 SRPs received from their participation, according to their research mentors, were related to gaining research skills and experience.

The program objective of training the students in up-to-date energy technologies was met to a limited degree according to the 1981 and 1982 research mentors, who reported that 44 percent of the 1981 SRPs and 36 percent of the 1982 SRPs received such training.

The next three objectives were not addressed in any specific survey question. However, by referring to the major program values cited by the students and the benefits the program provided the students according to their research mentors, the degree to which these objectives were met can be determined to some extent.

The second most frequently cited benefit the 1981 and 1982 research mentors reported the students received from the program was the use of equipment not available on campus. This response suggests that the objective of exposing students to special research facilities was met to some degree.

The program objective of providing the opportunity for students to focus on a research agenda with none of the distractions of the classroom appears to be supported in part by the 1981 and 1982 SRPs' indication that exposure to scientific research in a nonacademic environment was a major program value. In addition, the program objective of allowing the students to associate with experienced investigators was the third most frequently cited program value by both the 1981 and 1982 student research participants.

Since only 21 percent of the 1981 SRPs and 30 percent of the 1982 SRPs indicated that they had authored, co-authored, or had their assistance acknowledged in a scientific publication, it does not appear that the program objective of providing the students with the opportunity to have their research published was realized in large part. However, this response represents only 38 to 40 percent of the total 1981 and 1982 SRPs and should be viewed with caution. Furthermore, since approximately 40 percent of the research mentors indicated that contributions from the students had led to additional publications from the facility, perhaps this objective was met with some degree of success.

The final two objectives for the SRPs are to provide a pool of potential employees for DOE and to influence career choices. Although only 37 percent of the 1981 SRPs agreed that they might consider a career with DOE as a result of their participation in the program, over 50 percent of the 1982 SRPs felt they might make their careers with DOE. Two-thirds of the 1981/1982 SRP respondents to the follow-up survey reported that as a result of the program they intended to pursue further studies and/or a career in research. Furthermore, 57 percent of the 1981 SRPs and 66 percent of the 1982 SRPs reported in the exit survey that the program assignment had increased their desire to go to graduate school. Further evidence that the objective of influencing career choices was realized in the 1981 and 1982 programs was reflected in the fact that the students reported having the opportunity to consider career choices in research to be a major value of the program.

Program Objectives for Participating Facilities. With almost 100 percent of the 1981 and 1982 research mentors reporting that in an overall sense their research programs had benefited from the contributions of the students, the objective of strengthening the research programs at the facility appears to

have been met. However, in more specific terms, only 61 percent of the 1981 research mentors and 65 percent of the 1982 research mentors felt that the intellectual climate of the research group had been strengthened by the students' ideas and approaches, which was another program objective for the facilities. Given the differences in the education and experience between the students and the facility staff, these percentages represent a positive showing by the SRPs.

The program objective of training potential manpower in advanced energy technologies was met only to a limited degree, with 44 percent of the 1981 research mentors and 36 percent of the 1982 research mentors indicating such training had occurred. However, considering the educational level of these undergraduate students, perhaps advanced energy technology training was not deemed appropriate by many of the research mentors. Furthermore, some student research assignments were only indirectly energy-related (such as assignments in computer programming), and thus would not warrant advanced energy technology training.

Considering the education and experience of the students, it is not surprising that only 40 percent of the 1981 and 1982 research mentors indicated that contributions from the students had resulted in additional publications from the facility, another program objective for the participating facilities.

Although less than half of the 1981 and 1982 research mentors indicated they had gained new teaching skills as a result of supervising the SRPs, around three-fourths of the mentors reported they had gained administrative experience in dealing with personnel due to supervising the students. Furthermore, almost 100 percent of the research mentors stated they would be willing to supervise another student in the future. These responses suggest that the 1981 and 1982 Student Research Participation Programs fulfilled the program objective of enriching staff members through supervisory responsibilities.

The final objective for the participating facilities is to have new and fresh ideas brought to the research group by the students. This objective was realized to a limited extent according to the research mentors, with 46 percent reporting this type of student contribution in 1981 and 43 percent in 1982.

CONCLUSION

The 1981/1982 Faculty and Student Research Participation Programs provided research opportunities for 86 faculty members and 164 undergraduate students at a dozen DOE facilities. The responses to the four surveys conducted with each group indicate that these programs were a rewarding experience for both the participants and the DOE scientists with whom they worked. Furthermore, the programs fulfilled the objectives that ORAU determined should be met; in fact, in some cases these objectives were realized by almost 100 percent of the participants.

There were some ways in which the participants and the facility staff felt the program could be made more effective. Primarily, these suggestions were concerned with securing a way for the continuation of the participants' research efforts. In addition, many respondents encouraged both greater and earlier communication among participants, DOE facility staff, and ORAU. Finally, it appears that temporary housing arrangements were not satisfactory in many situations, particularly for participants assigned to DOE facilities in Oak Ridge, Tennessee. The City of Oak Ridge has a limited number of rental properties, and many participants must find housing in Knoxville, approximately 20 miles away from their work site. Furthermore, there is no public transportation between the two cities, a situation that apparently proved problematic for those participants who did not have access to a private automobile. These considerations aside, both the participants and the facility staff found the program to be a successful means of providing research experience and an exchange of ideas between the academic world and government research facilities.

The Faculty and Student Research Participation Programs are an important means of developing essential manpower to address the nation's energy concerns and of providing both students and faculty members the opportunity to conduct energy-related research in their fields of interest. The exchange of expertise between faculty and DOE facility staffs leads to new approaches to research problems, and the students have the opportunity to work with individuals who are highly qualified in their field of study. The energy-related training realized by the participants, the expertise the facilities gain from the

faculty participants, and the potential future manpower the student researchers might provide DOE result in a worthwhile and beneficial program for all involved.

TABLES

1981 AND 1982 FACULTY RESEARCH PARTICIPANT
ENTRY SURVEY TABLES

TABLE 1. PRIMARY OBJECTIVE FOR PARTICIPATING IN THE PROGRAM:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

Primary Objective[a]	1981 Response	1982 Response
1. To conduct research in my field of interest	38%	32%
2. To broaden my scientific background	11%	23%
3. To gain abilities as a researcher or sharpen previously acquired skills	11%	6%
4. To provide expertise	8%	---
5. To continue work on projects begun last summer	8%	---
6. To interact with researchers in my field	5%	10%
7. To use equipment and/or facilities not available on campus	5%	6%
8. To have an enriching cultural and social experience	3%	---
9. To become aware of the latest developments and new techniques in my field	3%	14%
10. To have summer employment	3%	---
11. To become familiar with DOE and to establish contacts with DOE personnel	3%	6%
12. No response	3%	3%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 2. TOTAL OBJECTIVES CITED FOR PARTICIPATING IN THE PROGRAM: Faculty Research Participation Program Evaluation Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

Primary Objective[a]	1981 Response[b]	1982 Response[c]
1. To conduct research in my field of interest	21%	23%
2. To broaden my scientific background	13%	11%
3. To gain abilities as a researcher or sharpen previously acquired skills	13%	10%
4. To become aware of the latest developments and new techniques in my field	10%	10%
5. To interact with researchers in my field	7%	14%
6. To become familiar with DOE and make contacts with DOE personnel	7%	11%
7. To have summer employment	5%	3%
8. To use equipment and/or facilities not available on campus	4%	10%
9. To provide expertise	4%	5%
10. To have a change from the academic environment	4%	3%
11. To continue work on projects begun last summer	4%	---
12. To become a better instructor	3%	---
13. To have an enriching cultural and social experience	2%	---
14. No response	1%	1%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 98 responses by 37 respondents.
[c]Represents 81 responses by 31 respondents

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 3. NUMBER OF RESPONDENTS WHO HAVE PREVIOUSLY PARTICIPATED IN THE PROGRAM OR IN A SIMILAR PROGRAM:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

	1981 Response	1982 Response
Prior participant at same facility	32%	39%
Prior participant at another facility or through a different program	5%	22%
First-time participant in any program	62%	39%
TOTAL	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 4. RESEARCH EXPERIENCE:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

	1981 Response	1982 Response
A. Is your research project at the facility an expansion of present or past work on your own?		
Yes	57%	45%
No	38%	52%
No response	5%	3%
	100%	100%
B. Do you expect to contribute expertise that is not available at the facility?		
Yes	81%	87%
No	8%	13%
No response	11%	---
	100%	100%

TABLE 5. MEANS BY WHICH PARTICIPANTS BECAME AWARE OF THE PROGRAM:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

	1981 Response[a]	1982 Response[b]
"Bulletin board" literature	32%	39%
Campus recruiter	---	6%
Former participant	23%	22%
Head of department	7%	6%
Journal	9%	6%
Other	30%	19%
No response	---	3%
TOTAL	100%	100%

[a]Represents 44 responses by 37 respondents.
[b]Represents 36 responses by 31 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 6. PARTICIPATION SUPPORT:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

	1981 Response	1982 Response
A. Did you receive support from your department head to proceed with this venture?		
Yes	78%	74%
No	19%	26%
No response	3%	---
	100%	100%
B. Did you know any of the members of the facility staff before applying for the program?		
Yes	62%	65%
No	35%	35%
No response	3%	---
	100%	100%

TABLE 7. PARTICIPANT BENEFITS:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

	1981 Response	1982 Response
A. Do you anticipate using facility equipment that you do not have access to on campus?		
Yes	76%	74%
No	22%	26%
No response	3%	---
	100%	100%
B. Do you anticipate that this experience will provide additional expertise that you do not now have?		
Yes	95%	97%
No	3%	3%
No response	3%	---
	100%	100%
C. Do you anticipate research collaboration with the DOE facility after your present appointment has expired?		
Yes	78%	94%
No	22%	3%
No response	---	3%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 8. NUMBER OF GRADUATE STUDENTS TAUGHT BY PARTICIPANTS IN AN ACADEMIC YEAR:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

Number of Graduate Students Taught	1981 Response	1982 Response
1-25	51%	45%
26-50	5%	13%
Over 100	3%	---
None	38%	42%
No response	3%	---
TOTAL	100%	100%

TABLE 9. NUMBER OF UNDERGRADUATE STUDENTS TAUGHT BY PARTICIPANTS IN AN ACADEMIC YEAR:
Faculty Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 37)
(1982 Respondents = 31)

Number of Undergraduate Students Taught	1981 Response	1982 Response
1-50	11%	6%
51-100	22%	35%
101-150	16%	19%
151-250	32%	29%
Over 250	14%	10%
No response	5%	---
TOTAL	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

1981 AND 1982 FACULTY RESEARCH PARTICIPANT
EXIT SURVEY TABLES

TABLE 10. RESEARCH PLANS AND OBJECTIVES:
Faculty Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

	1981 Response	1982 Response
A. Did you establish a research plan in consultation with your contact at the DOE facility prior to your appointment?		
Yes	70%	74%
No	30%	24%
No response	---	3%
	100%	100%
B. If so, was the plan followed?		
Yes	67%	66%
NA	12%	24%
No	3%	5%
No response	18%	5%
	100%	100%
C. Were the outcomes of this appointment consonant with your expectations?		
Yes	91%	89%
No	6%	11%
No response	3%	---
	100%	100%
D. My original objectives were fulfilled in the course of the research experience.		
Strongly agree	36%	47%
Agree	58%	39%
Undecided	3%	5%
Disagree	---	5%
Strongly disagree	3%	3%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 11. RESEARCH EXPERIENCE AND INTENTIONS:
Faculty Research Participation Program Evaluation
Exit Questionaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

	1981 Response	1982 Response
A. Were you engaged in energy research prior to this appointment?		
Yes	64%	68%
No	33%	32%
No response	3%	---
	100%	100%
B. Do you intend to continue research in energy on campus?		
Yes	79%	92%
No	18%	8%
No response	3%	---
	100%	100%
C. I intend to pursue additional research in the same general area.		
Strongly agree	58%	63%
Agree	33%	32%
Undecided	9%	5%
Disagree	---	---
Strongly disagree	---	---
	100%	100%
D. Have you or do you expect to receive a grant or contract from the DOE facility for work on your campus?		
Yes	36%	45%
No	55%	45%
No response	9%	10%
	100%	100%

TABLE 12. RESEARCH TIME AND PERSONNEL:
Faculty Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

	1981 Response	1982 Response
A. Being away from the university allowed me to accomplish more research than I would have if I had spent the time on campus.		
Strongly agree	64%	63%
Agree	18%	34%
Undecided	15%	3%
Disagree	---	---
Strongly Disagree	3%	---
	100%	100%
B. Interactions with the researchers at the facility were enriching.		
Strongly agree	55%	74%
Agree	42%	24%
Undecided	---	3%
Disagree	3%	---
Strongly disagree	---	---
	100%	100%
C. The facility personnel were helpful during my orientation period.		
Strongly agree	55%	63%
Agree	36%	29%
Undecided	---	5%
Disagree	3%	---
Strongly disagree	---	3%
No response	6%	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 13. RESEARCH SKILLS AND EQUIPMENT:
Faculty Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

	1981 Response	1982 Response
A. I have learned energy technologies unfamiliar to me prior to my participation in the program.		
Strongly agree	45%	29%
Agree	33%	58%
Undecided	6%	3%
Disagree	6%	8%
Strongly disagree	9%	---
No response	---	3%
	100%	101%
B. I used equipment not available on campus.		
Strongly agree	36%	42%
Agree	24%	29%
Undecided	6%	3%
Disagree	15%	16%
Strongly disagree	9%	5%
No response	9%	5%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 14. MAJOR VALUE OF THE PROGRAM:
Faculty Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

Major Value of Program[a]	1981 Response[b]	1982 Response[c]
1. The interaction between academicians and DOE scientists	34%	36%
2. Provides faculty with the latest equipment and funds for uninterrupted research	20%	23%
3. An opportunity to learn new research methods	18%	8%
4. Keeps faculty aware of developments in energy research	14%	17%
5. Provides government contacts and current topics for use in one's university work	7%	4%
6. Allows scientists from small schools to remain researchers	5%	3%
7. Allows faculty to provide expertise to government research programs	---	8%
8. Other	2%	1%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 44 responses by 33 respondents.
[c]Represents 66 responses by 38 respondents.

TABLE 15. PROGRAM RECOMMENDATIONS:
Faculty Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

	1981 Response	1982 Response
A. I recommend a similar experience for any interested graduate student.		
Strongly agree	45%	58%
Agree	48%	34%
Undecided	---	3%
Disagree	3%	---
Strongly disagree	3%	---
No response	---	5%
	100%	100%
B. I recommend this program to other interested faculty members.		
Strongly agree	58%	76%
Agree	33%	24%
Undecided	9%	---
Disagree	---	---
Strongly agree	---	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 16. HOUSING AND STIPEND:
Faculty Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

	1981 Response	1982 Response
A. Housing was satisfactory.		
Strongly agree	6%	18%
Agree	48%	42%
Undecided	18%	16%
Disagree	3%	8%
Strongly disagree	6%	5%
NA	18%	11%
	100%	100%
B. Funds provided for this program were adequate.		
Strongly agree	33%	29%
Agree	48%	63%
Undecided	12%	3%
Disagree	3%	3%
Strongly disagree	3%	---
No response	---	3%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 17. SUGGESTIONS TO INCREASE THE EFFECTIVENESS OF THE PROGRAM: Faculty Research Participation Program Evaluation Exit Questionnaire, 1981 and 1982

(1981 Respondents = 33)
(1982 Respondents = 38)

	Suggestions to Increase Program Effectiveness[a]	1981 Response[b]	1982 Response[c]
1.	Improve housing arrangements	25%	7%
2.	Arrange for participants to continue research during future summers or at their own university	15%	34%
3.	Announce appointments earlier	10%	10%
4.	Projects need to be planned in advance	10%	3%
5.	More interaction before the program starts	10%	7%
6.	Maintain contact with participants throughout the year	5%	3%
7.	Provide better support services (secretarial help, mail system, supplies, etc.)	5%	7%
8.	Provide longer research period for participants on sabbaticals or 6-months' leave	5%	---
9.	Utilize equipment not available on campus	5%	---
10.	Allow flextime and/or leave time	5%	---
11.	Increase salaries	5%	---
12.	Provide a description of the research needs of the facility before program starts	---	7%
13.	Provide a better orientation explaining DOE policies and procedures	---	7%

(Continued)

TABLE 17. SUGGESTIONS TO INCREASE THE EFFECTIVENESS OF THE PROGRAM (Continued)

Suggestions to Increase Program Effectiveness[a]	1981 Response[b]	1982 Response[c]
14. Give energy centers a free choice of participants	---	3%
15. Other	---	10%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents multiple responses by 17 respondents. Sixteen respondents had no suggestions.
[c]Represents multiple response by 23 respondents. Fifteen respondents had no suggestions.

NOTE: Columns may not add to 100% due to numerical rounding.

1981 AND 1982 RESEARCH COLLABORATOR SURVEY TABLES

TABLE 18. RESEARCH COLLABORATOR BENEFITS FROM THE PARTICIPANT:
Faculty Research Participation Program Evaluation
Research Collaborator Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 22)

	1981 Response	1982 Response
A. My experience of being a research collaborator was a rewarding one.		
Strongly agree	39%	55%
Agree	57%	36%
Undecided	4%	---
Disagree	---	9%
Strongly disagree	---	---
	100%	100%
B. I have gained new knowledge as a result of collaboration with this faculty member.		
Strongly agree	29%	41%
Agree	57%	50%
Undecided	11%	5%
Disagree	---	5%
Strongly disagree	---	---
No response	4%	---
	100%	100%
C. The faculty participant contributed expertise that is not available at the facility.		
Strongly agree	25%	18%
Agree	43%	45%
Undecided	21%	18%
Disagree	11%	14%
Strongly disagree	---	---
No response	---	5%
	100%	100%

(Continued)

TABLE 18. RESEARCH COLLABORATOR BENEFITS FROM THE PARTICIPANT (Continued)

	1981 Response	1982 Response
D. My research has moved much faster with the aid of the faculty participant than it would have without his/her assistance.		
Strongly agree	39%	36%
Agree	43%	45%
Undecided	18%	14%
Disagree	---	5%
Strongly disagree	---	---
	100%	100%
E. I am willing to supervise another faculty member.		
Strongly agree	43%	45%
Agree	54%	55%
Undecided	4%	---
Disagree	---	---
Strongly disagree	---	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 19. FACILITY RESEARCH PROGRAM BENEFITS FROM THE PARTICIPANT:
Faculty Research Participation Program Evaluation
Research Collaborator Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 22)

	1981 Response	1982 Response
A. The research program at the facility has benefited from contributions of this faculty member.		
Strongly agree	50%	41%
Agree	46%	55%
Undecided	4%	5%
Disagree	---	---
Strongly disagree	---	---
	100%	100%
B. The faculty participant brought creative ideas and approaches to the facility.		
Strongly agree	32%	27%
Agree	64%	59%
Undecided	4%	9%
Disagree	---	5%
Strongly disagree	---	---
	100%	100%
C. The intellectual climate of the research group was strengthened by the presence of this faculty participant.		
Strongly agree	32%	32%
Agree	61%	55%
Undecided	7%	14%
Disagree	---	---
Strongly disagree	---	---
	100%	101%[a]

(Continued)

TABLE 19. FACILITY RESEARCH PROGRAM BENEFITS FROM THE PARTICIPANT (Continued)

	1981 Response	1982 Response
D. The contributions from this faculty participant will result in additional publication(s) from the facility.		
Strongly agree	32%	41%
Agree	43%	41%
Undecided	18%	18%
Disagree	7%	---
Strongly disagree	---	---
	100%	100%
E. Faculty participants contribute to accomplishing the mission of the facility.		
Strongly agree	39%	55%
Agree	57%	41%
Undecided	4%	5%
Disagree	---	---
Strongly disagree	---	---
	100%	100%
F. The rapport between this facility and the faculty member's university has been expanded as a result of his/her participation.		
Strongly agree	4%	9%
Agree	46%	64%
Undecided	50%	23%
Disagree	---	---
Strongly disagree	---	5%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 20. PARTICIPANT'S CONTRIBUTION TO FACILITY'S RESEARCH:
Faculty Research Participation Program Evaluation
Research Collaborator Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 22)

Participant's Contribution to Facility's Research[a]	1981 Response[b]	1982 Response[c]
1. Developed background data and/or new experimental data for ongoing research project	45%	67%
2. Developed new research methodology or procedures	13%	7%
3. Reviewed and/or organized data	13%	7%
4. Enabled research to be completed on schedule	6%	---
5. Initiated work in a new research area	10%	4%
6. Aided project staff in meeting their goals	6%	---
7. Provided a new perspective on the project	6%	11%
8. No response	---	4%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended question.
[b]Represents 31 responses by 28 respondents.
[c]Represents 27 responses by 22 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 21. ENERGY TECHNOLOGY TRAINING:
Faculty Research Participation Program Evaluation
Research Collaborator Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 22)

	1981 Response	1982 Response
The faculty participant was trained in advanced energy technologies while at the facility.		
Strongly agree	18%	27%
Agree	50%	45%
Undecided	11%	14%
Disagree	21%	9%
Strongly disagree	---	5%
	100%	100%

TABLE 22. CONTINUING CONTACT WITH PARTICIPANT:
Faculty Research Participation Program Evaluation
Research Collaborator Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 22)

	1981 Response	1982 Response
A. I expect to continue collaborative association with this faculty participant.		
Strongly agree	36%	45%
Agree	50%	41%
Undecided	14%	5%
Disagree	---	9%
Strongly disagree	---	---
	100%	100%
B. I feel this faculty participant could be a useful contractor for DOE.		
Strongly agree	25%	36%
Agree	50%	45%
Undecided	21%	9%
Disagree	---	9%
Strongly disagree	---	---
No response	4%	---
	100%	100%
C. Have you or do you intend to give the participant a grant or contract to continue his/her research?		
Yes	50%	41%
No	39%	45%
No response	11%	14%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 23. MAJOR VALUE OF PROGRAM:
Faculty Research Participation Program Evaluation
Research Collaborator Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 22)

Major Value of Program[a]	1981 Response[b]	1982 Response[c]
1. Exchange of methodology techniques and viewpoints	42%	37%
2. Increased number of trained staff members for short periods of time	21%	11%
3. Stimulate research skills in all involved	15%	26%
4. Facilities available for participant to carry out research on a topic of his/her interest	6%	4%
5. Give participant topics to use at his/her university	3%	---
6. Participant experiences the nonacademic world	3%	7%
7. Establish working relationship between DOE and academic community	3%	11%
8. Other	6%	4%
	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 33 responses from 28 respondents.
[c]Represents 27 responses by 22 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 24. SUGGESTIONS TO INCREASE THE EFFECTIVENESS OF THE PROGRAM: Faculty Research Participation Program Evaluation Research Collaborator Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 22)

Suggestions to Increase Program Effectiveness[a]	1981 Response[b]	1982 Response[c]
1. Renew appointments for future summer and/or continued interaction	40%	6%
2. Improve recruitment	20%	6%
3. Better planning for applicant positions	15%	47%
4. Extend the length of the appointment	10%	---
5. Increase the number of positions	5%	---
6. Improve communications among facility, participant, and ORAU	---	12%
7. Arrange an annual meeting for participants to present papers on their research	---	12%
8. Increase participant's stipend	---	12%
9. Other	10%	6%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents multiple responses by 17 respondents. Eleven respondents had no suggestions.
[c]Represents 17 single responses. Five respondents had no suggestions.

NOTE: Columns may not add to 100% due to numerical rounding.

1981 AND 1982 FACULTY RESEARCH PARTICIPANT
FOLLOW-UP SURVEY TABLES

TABLE 25. ACADEMIC BENEFITS FROM PROGRAM PARTICIPATION:
Faculty Research Participation Program Evaluation
Follow-Up Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 31)

	1981 Response	1982 Response
A. I have or will incorporate knowledge gained from my participation in the program into my teaching.		
Strongly agree	50%	52%
Agree	43%	42%
Undecided	4%	6%
Disagree	---	---
Strongly disagree	---	---
No response	4%	---
	100%	100%
B. I plan to offer a new course(s) based on knowledge gained from my participation.		
Strongly agree	11%	19%
Agree	11%	26%
Undecided	28%	23%
Disagree	36%	16%
Strongly disagree	11%	10%
No response	4%	6%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 26. RESEARCH BENEFITS FROM PROGRAM PARTICIPATION:
Faculty Research Participation Program Evaluation
Follow-Up Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 31)

	1981 Response	1982 Response
A. As a result of this experience I am better prepared to direct student research in related areas.		
Strongly agree	64%	74%
Agree	32%	23%
Undecided	---	---
Disagree	---	---
Strongly disagree	---	---
No response	4%	3%
	100%	100%
B. I have or will originate a new research program related to my research at the DOE facility.		
Strongly agree	50%	52%
Agree	18%	32%
Undecided	21%	6%
Disagree	7%	6%
Strongly disagree	---	3%
No response	4%	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 27. CONTACT WITH FACILITY:
Faculty Research Participation Program Evaluation
Follow-Up Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 31)

	1981 Response	1982 Response
A. I have maintained contact with the facility since I returned to campus.		
Strongly agree	71%	68%
Agree	18%	32%
Undecided	---	---
Disagree	4%	---
Strongly disagree	---	---
No response	7%	---
	100%	100%
B. I am now or intend to continue collaborating with the facility on the research conducted while there.		
Strongly agree	64%	74%
Agree	14%	23%
Undecided	14%	3%
Disagree	4%	---
Strongly disagree	---	---
No response	4%	---
	100%	100%

TABLE 28. GRANT PROPOSALS RESULTING FROM RESEARCH:
Faculty Research Participation Program Evaluation
Follow-Up Questionnaire, 1981 and 1982

(1981 Respondents = 28)
(1982 Respondents = 31)

	1981 Response	1982 Response
A. The research conducted during this appointment will be of value in preparing grant proposals.		
Strongly agree	50%	61%
Agree	32%	26%
Undecided	7%	6%
Disagree	7%	3%
Strongly disagree	---	---
No response	4%	3%
	100%	100%
B. Have you submitted or plan to submit grant proposals as a result of your research with DOE?		
Yes	64%	39%
No	32%	58%
No response	4%	3%
	100%	100%
C. If yes, to what agencies?		
Department of Energy	66%	50%
National Science Foundation	22%	33%
National Institutes of Health	11%	---
Other	---	17%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

1981 AND 1982 STUDENT RESEARCH PARTICIPANT
ENTRY SURVEY TABLES

TABLE 29. PRIMARY OBJECTIVE CITED FOR PARTICIPATING IN THE PROGRAM: Student Research Participation Program Evaluation Entry Questionnaire, 1981 and 1982

(1981 Respondents = 38)
(1982 Respondents = 74)

Primary Objective[a]	1981 Response	1982 Response
1. To gain research experience	53%	65%
2. To gain further knowledge in my field	13%	9%
3. To aid me in making career decisions or meeting career goals	11%	3%
4. To gain "hands-on" laboratory experience	5%	11%
5. To apply knowledge gained in an academic setting	5%	3%
6. To have a new learning experience and/or challenging work	5%	---
7. To learn how a large research facility operates	5%	3%
8. To live in a different location and meet different people	3%	---
9. To have summer employment	---	3%
10. To learn how to use new equipment and new techniques	---	1%
11. To obtain college credit	---	1%
12. No response	---	1%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.

TABLE 30. TOTAL OBJECTIVES CITED FOR PARTICIPATING IN THE PROGRAM: Student Research Participation Program Evaluation Entry Questionnaire, 1981 and 1982

(1981 Respondents = 38)
(1982 Respondents = 74)

Objectives[a]	1981 Response[b]	1982 Response[c]
1. To gain research experience	28%	29%
2. To gain further knowledge in my field	18%	14%
3. To aid me in making career decisions or meeting career goals	16%	11%
4. To meet peers and professionals with similar interests	8%	5%
5. To learn how a large research facility operates	8%	3%
6. To gain "hands-on" laboratory experience	6%	7%
7. To apply knowledge gained in an academic setting	5%	1%
8. To live in a different location and meet new people	4%	3%
9. To have a new learning experience and/or challenging work	3%	2%
10. To have summer employment	3%	9%
11. To learn how to use new equipment and new techniques	1%	4%
12. To obtain college credit	1%	3%
13. To write and publish papers	---	2%
14. Other	---	2%
15. No response	---	[d]
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 102 responses by 38 respondents.
[c]Represents 201 responses by 74 respondents.
[d]Less than .05 percent.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 31. MEANS BY WHICH PARTICIPANT BECAME AWARE OF THE PROGRAM: Student Research Participation Program Evaluation Entry Questionnaire, 1981 and 1982

(1981 Respondents = 38)
(1982 Respondents = 74)

	1981 Response[a]	1982 Response[b]
"Bulletin board" literature	36%	29%
Campus recruiter	2%	---
Former participant	11%	15%
Head of department	13%	11%
Major professor	26%	23%
Journal	2%	1%
Other	9%	21%
TOTAL	100%	100%

[a]Represents 53 responses by 38 respondents.
[b]Represents 84 responses by 74 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 32. PARTICIPANT EXPECTATIONS:
Student Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 38)
(1982 Respondents = 74)

	1981 Response	1982 Response
A. Have you had occasion to talk to a fellow student or faculty member who has participated in this program previously?		
Yes	39%	45%
No	61%	55%
	100%	100%
B. Did you know any members of the facility staff before being selected for the program?		
Yes	5%	16%
No	95%	84%
	100%	100%
C. The area of research for which your were chosen was your:		
First choice	63%	68%
Second choice	8%	20%
Other	29%	8%
No response	---	4%
	100%	100%

TABLE 33. PROGRAM PREPARATION:
Student Research Participation Program Evaluation
Entry Questionnaire, 1981 and 1982

(1981 Respondents = 38)
(1982 Respondents = 74)

	1981 Response	1982 Response
A. Have you had any communication with your research mentor concerning the nature of the research that you will be conducting?		
Yes	71%	64%
No	29%	35%
No response	—	1%
	100%	100%
B. Were a specific work plan and reading references provided to you by your research mentor in advance of the starting date?		
Yes	37%	46%
No	63%	54%
	100%	100%

TABLE 34. AREAS OF EXPERTISE PARTICIPANTS EXPECT TO GAIN FROM THE PROGRAM: Student Research Participation Program Evaluation Entry Questionnaire, 1981 and 1982

(1981 Respondents = 38)
(1982 Respondents = 74)

Areas of Expertise[a]	1981 Response[b]	1982 Response[c]
Research and research techniques	46%	51%
Major subject	14%	14%
Use of equipment	13%	17%
Practical applications	8%	12%
Independent work	6%	---
Choices for careers in energy research	6%	1%
Writing/publishing	3%	2%
Other	---	1%
No response	3%	3%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 65 responses by 38 respondents.
[c]Represents 102 responses by 74 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

1981 AND 1982 STUDENT RESEARCH PARTICIPANT
EXIT SURVEY TABLES

TABLE 35. PROGRAM PREPARATION:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

	1981 Response	1982 Response
A. Prior to my arrival my research supervisor had contacted me.		
Strongly agree	22%	32%
Agree	34%	27%
Undecided	---	---
Disagree	16%	18%
Strongly disagree	24%	22%
No response	4%	1%
	100%	100%
B. Research supervisors should contact students and provide them with written material about their research prior to their arrival.		
Strongly agree	78%	80%
Agree	16%	16%
Undecided	4%	3%
Disagree	2%	1%
Strongly disagree	---	---
	100%	100%
C. My academic preparation for my research assignment was adequate.		
Strongly agree	31%	26%
Agree	55%	62%
Undecided	9%	5%
Disagree	4%	7%
Strongly disagree	1%	---
	100%	100%

TABLE 36. ASSISTANCE IN MEETING PROGRAM REQUIREMENTS:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

	1981 Response	1982 Response
A. My supervisor in the laboratory was available to guide or assist me.		
Strongly agree	53%	55%
Agree	36%	36%
Undecided	4%	4%
Disagree	5%	3%
Strongly disagree	1%	1%
No Response	1%	---
	100%	100%
B. The orientation session was beneficial and interesting.		
Strongly agree	5%	8%
Agree	41%	47%
Undecided	31%	23%
Disagree	12%	14%
Strongly disagree	8%	7%
No response	4%	1%
	101%[a]	100%
C. The equipment and information at my disposal were adequate to carry out my research assignment.		
Strongly agree	51%	46%
Agree	39%	47%
Undecided	6%	5%
Disagree	2%	---
Strongly disagree	1%	1%
No response	1%	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 37. SATISFACTION WITH ASSIGNMENT:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

	1981 Response	1982 Response
A. My research assignment was valuable to me.		
Strongly agree	62%	61%
Agree	29%	36%
Undecided	5%	---
Disagree	4%	1%
Strongly disagree	---	---
No response	---	1%
	100%	100%
B. My research assignment exceeded my expectations.		
Strongly agree	20%	14%
Agree	33%	45%
Undecided	18%	14%
Disagree	26%	24%
Strongly disagree	4%	4%
	100%	100%
C. My research assignment matched my interest.		
Strongly agree	24%	23%
Agree	48%	55%
Undecided	12%	12%
Disagree	15%	7%
Strongly disagree	1%	3%
	100%	100%

(Continued)

TABLE 37. SATISFACTION WITH ASSIGNMENT (Continued)

	1981 Response	1982 Response
C. The content of my assignment was investigative and challenging.		
Strongly agree	34%	31%
Agree	40%	51%
Undecided	13%	12%
Disagree	11%	5%
Strongly disagree	2%	---
	100%	100%
E. The content of my assignment was just a job and at times boring.		
Strongly agree	2%	3%
Agree	14%	7%
Undecided	15%	16%
Disagree	44%	54%
Strongly disagree	25%	20%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 38. HOUSING AND TRANSPORTATION:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

	1981 Response	1982 Response
A. Housing for an appointee is a major drawback to acceptance.		
Strongly agree	7%	7%
Agree	14%	9%
Undecided	19%	27%
Disagree	42%	47%
Strongly disagree	13%	5%
No Response	5%	4%
	100%	100%
B. Housing for an appointee is no more difficult than one would expect for the average short-term stay in a new location.		
Strongly agree	13%	5%
Agree	54%	50%
Undecided	19%	24%
Disagree	9%	12%
Strongly disagree	2%	1%
No response	2%	7%
	100%	100%
C. Advanced communications from ORAU about housing were frank from the beginning of the offer.		
Strongly agree	13%	12%
Agree	49%	45%
Undecided	18%	19%
Disagree	11%	15%
Strongly disagree	7%	5%
No response	2%	4%
	100%	100%

(Continued)

TABLE 38. HOUSING AND TRANSPORTATION (Continued)

	1981 Response	1982 Response
D. Advance communications from ORAU about housing minimized problems actually encountered.		
Strongly agree	7%	8%
Agree	40%	34%
Undecided	26%	38%
Disagree	21%	7%
Strongly disagree	4%	8%
No response	2%	5%
	100%	100%
E. Transportation was less of a problem than I anticipated.		
Strongly agree	14%	4%
Agree	52%	50%
Undecided	11%	26%
Disagree	15%	9%
Strongly disagree	7%	7%
No response	1%	4%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 39. PROGRAM IMPACTS:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

	1981 Response	1982 Response
A. As a result of my training, I received indepth background for a major senior year course or an honors course or paper.		
Strongly agree	15%	27%
Agree	29%	35%
Undecided	22%	16%
Disagree	21%	18%
Strongly disagree	11%	3%
No response	1%	1%
	100%	100%
B. My assignment increased my desire to go to graduate school.		
Strongly agree	25%	15%
Agree	32%	51%
Undecided	28%	23%
Disagree	12%	8%
Strongly disagree	2%	1%
No response	1%	1%
	100%	100%
C. As a result of my participation in this program I may consider a career with DOE.		
Strongly agree	12%	12%
Agree	25%	41%
Undecided	36%	35%
Disagree	18%	5%
Strongly disagree	8%	7%
No response	1%	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 40. PLANS AFTER COLLEGE GRADUATION:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

Plans After College Graduation	1981 Response	1982 Response
Go to graduate school in an energy-related area	32%	34%
Go to graduate school in a nonenergy-related area	33%	32%
Go to medical (or other professional) school	24%	18%
Begin a career in an energy-related area	4%	4%
Begin a career in a nonenergy-related area	2%	3%
Other	6%	9%
TOTAL	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 41. HIGHEST DEGREE PARTICIPANT EXPECTS TO RECEIVE:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

Highest Degree Expected	1981 Response	1982 Response
Ph.D.	54%	55%
M.D.	15%	11%
M.S.	18%	26%
B.S./B.A.	2%	1%
Other	11%	5%
No response	---	1%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 42. MAJOR VALUE OF PROGRAM:
Student Research Participation Program Evaluation
Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

Major Value of Program[a]	1981 Response[b]	1982 Response[c]
1. Provides research experience	26%	31%
2. Exposure to scientific research in a nonacademic environment	21%	19%
3. Association with people who are educated and experienced in the field	12%	16%
4. Provides the opportunity to look at career possibilities	12%	10%
5. Allows participant to learn about a specific field	6%	2%
6. Provides the opportunity to see how a government research facility works	5%	7%
7. Provides the opportunity to work with the latest research equipment	4%	6%
8. Allows the participant to work independently on an entire research project or paper	4%	1%
9. Teaches the participant different research procedures and laboratory techniques	4%	2%
10. Provides the opportunity to live independently	2%	1%
11. Allows the participant to apply knowledge learned in an academic setting	2%	5%
12. Other	1%	---
13. No response	---	1%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 138 responses by 85 respondents.
[c]Represents 124 responses by 74 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 43. SUGGESTIONS TO INCREASE THE EFFECTIVENESS OF THE PROGRAM: Student Research Participation Program Evaluation Exit Questionnaire, 1981 and 1982

(1981 Respondents = 85)
(1982 Respondents = 74)

Suggestions to Increase Program Effectiveness[a]	1981 Response[b]	1982 Response[c]
1. Increase communication between student and his/her supervisor prior to the starting date in order to help the student prepare for the tasks awaiting him/her	32%	24%
2. Increase the level of supervision by ORAU over the supervisors in the participating facilities to ensure that students will have actual research to conduct	16%	9%
3. Provide more information about research programs and facilities both within and outside the department where the student is working	13%	11%
4. Provide more opportunities for the participating students to communicate with each other and share their research experiences	9%	8%
5. Improve student housing and/or transportation situation both in Oak Ridge and elsewhere	9%	17%
6. Provide more accurate matching of students' skills or interests with the assignments they are given	8%	8%
7. Expand advertisements of program to a larger audience, including publicity for lesser known divisions and facilities	4%	2%
8. Increase the number of weeks in the program from ten to twelve or fourteen	3%	2%

(Continued)

TABLE 43. SUGGESTIONS TO INCREASE THE EFFECTIVENESS OF THE PROGRAM (Continued)

Suggestions to Increase Program Effectiveness[a]	1981 Response[b]	1982 Response[c]
9. Increase communication between research mentor and student regarding the progress and problems of the project in which the student is working	---	9%
10. Increase communication between ORAU and student participants, including earlier notification of student's acceptance and information about the facility prior to student's arrival	---	8%
11. Other	4%	5%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 91 responses by 72 respondents. Thirteen respondents had no suggestions.
[c]Represents 66 responses by 54 respondents. Twenty respondents had no suggestions.

NOTE: Columns may not add to 100% due to numerical rounding.

1981 AND 1982 RESEARCH MENTOR
SURVEY TABLES

TABLE 44. PREPARATION PROVIDED TO RESEARCH MENTOR:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
A. Was it clear to you as to what your role as a research mentor entailed?		
Yes	90%	97%
No	10%	2%
No response	---	2%
	100%	100%
B. Was the general information you received about the Student Research Participation Program adequate?		
Yes	86%	83%
No	13%	16%
No response	1%	2%
	100%	100%
C. Was a copy of the student's file made available to you in advance?		
Yes	91%	86%
No	9%	14%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 45. AMOUNT OF ADVANCE NOTICE OF STUDENT ASSIGNMENT:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Amount of Advance Notice	1981 Response	1982 Response
Less than one week	5%	3%
One to two weeks	4%	7%
Three weeks	8%	12%
One month	29%	28%
Two months	39%	36%
Three months	10%	9%
Four months	5%	3%
No advance notice given	---	2%
TOTAL	100%	100%

TABLE 46. PREPARATION MADE FOR PROGRAM PARTICIPANTS:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
A. Did you write or talk to the student in advance about the nature or content of possible research participation assignments?		
Yes	67%	64%
No	33%	36%
	100%	100%
B. Was a specific topic of work planned and reading references provided in advance of the starting date?		
Yes	56%	69%
No	44%	31%
	100%	100%

TABLE 47. REASONS FOR PARTICIPANT SELECTION:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Reasons for Participant Selection[a]	1981 Response[b]	1982 Response[c]
Academic record	25%	28%
Background in subject	24%	27%
Indicated interest	23%	18%
Recommendations	16%	10%
Total file	---	3%
Only participant available	2%	1%
Did not select participant	7%	5%
Other	3%	4%
No response	1%	3%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 116 responses by 79 respondents.
[c]Represents 96 responses by 58 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 48. SATISFACTION WITH PARTICIPANT:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
A. Was the quality of the participant consistent with your expectations as judged by the application?		
Yes	91%	93%
No	5%	---
No response	4%	7%
	100%	100%
B. Have you supervised other participants?		
Yes	62%	66%
No	38%	33%
No response	---	2%
	100%	100%
C. If yes, how did the quality of the work of this student compare with the work done by others?		
Superior	59%	55%
Average	37%	45%
Poor	4%	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 49. RATING OF PARTICIPANT'S PERFORMANCE:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Rating of Participant's Performance	1981 Response	1982 Response
Superior	48%	50%
Above average	38%	40%
Average	11%	9%
Below averge	3%	---
Poor	---	---
No response	---	2%
TOTAL	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 50. INFLUENCE OF RESEARCH EXPERIENCE ON STUDENTS' ATTITUDE TOWARD RESEARCH OR CAREER GOALS:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
A. Do you know whether the research experience had any influence on the student's attitude toward research or his/her career goals?		
Yes	58%	48%
No	42%	45%
No response	---	7%
	100%	100%

B.

Influence of Research Experience on Attitudes Toward Research/Career Goals[a]	1981 Response[b]	1982 Response[c]
1. Plans to pursue graduate study and/or career in program area in which student was assigned	52%	36%
2. Developed increased research and/or technical skills as a result of participation in the program	22%	36%
3. Interest in research was intensified	20%	18%
4. Other	7%	11%
	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents responses by 46 respondents who indicated "yes" in Part A of this table.
[c]Represents responses by 28 respondents who indicated "yes" in Part A of this table.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 51. STUDENT BENEFITS FROM RESEARCH ASSIGNMENT:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Student Benefits from Research Assignment[a]	1981 Response[b]	1982 Response[c]
1. Experience in working in a research environment	28%	34%
2. Use of equipment and techniques not available on student's college campus	21%	33%
3. More detailed knowledge and skill in the specific subject studied	20%	11%
4. Application of knowledge learned in an academic setting	12%	7%
5. Experience of performing individual experiments in a chosen subject	6%	4%
6. Exposure to a research facility	4%	4%
7. Aid in making decisions regarding career and/or graduate school	3%	5%
8. Interaction with professional scientists and peers with similar interests	3%	1%
9. Other	1%	---
10. No response	4%	2%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 107 responses by 79 respondents.
[c]Represents 83 responses by 58 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 52. ENERGY TECHNOLOGY TRAINING:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
The student participant was trained in advanced energy technologies while at the facility.		
Strongly agree	11%	12%
Agree	33%	24%
Undecided	16%	14%
Disagree	23%	28%
Strongly disagree	13%	17%
No response	4%	5%
	100%	100%

TABLE 53. RESEARCH MENTOR BENEFITS FROM THE PROGRAM:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
A. My experience of being a research mentor was a rewarding one.		
Strongly agree	42%	36%
Agree	46%	57%
Undecided	9%	7%
Disagree	4%	---
Strongly disagree	---	---
	100%	100%
B. I have gained new teaching skills as a result of supervising this student.		
Strongly agree	6%	12%
Agree	38%	40%
Undecided	34%	29%
Disagree	18%	17%
Strongly disagree	1%	---
No response	3%	2%
	100%	100%
C. I have gained experience in dealing with personnel as a result of this supervisory experience.		
Strongly agree	6%	12%
Agree	66%	55%
Undecided	15%	21%
Disagree	9%	12%
Strongly disagree	3%	---
	100%	100%

(Continued)

TABLE 53. RESEARCH MENTOR BENEFITS FROM THE PROGRAM (Continued)

	1981 Response	1982 Response
D. My research has moved faster with the aid of this student than it would have without his/her assistance.		
Strongly agree	46%	43%
Agree	39%	41%
Undecided	11%	10%
Disagree	3%	5%
Strongly agree	1%	---
	100%	100%
E. I would be willing to supervise another student participant in the future.		
Strongly agree	48%	50%
Agree	46%	45%
Undecided	6%	5%
Disagree	---	---
Strongly disagree	---	---
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 54. PROGRAM EFFECTS ON FACILITY STAFF:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Program Effects on Facility Staff[a]	1981 Response[b]	1982 Response[c]
1. The student's work allowed us to complete or get nearer to completion on a project on which we were currently working	37%	34%
2. The student's enthusiasm acted as a stimulus to our group	18%	13%
3. The student's work allowed us to do research in an area in which we were interested but unable to pursue	11%	14%
4. Interaction with the student gave the group new insights	9%	6%
5. Positive effect	5%	11%
6. Provided research mentor experience in teaching	1%	5%
7. Other	8%	5%
8. Negative effect due to the time involved in supervising and training the student	---	3%
9. No effect on facility staff	4%	5%
10. No response	8%	5%
	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 93 responses by 79 respondents.
[c]Represents 64 responses by 58 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 55. FACILITY RESEARCH PROGRAM BENEFITS FROM THE PARTICIPANT:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
A. The research program at the facility has benefited from contributions of this student participant.		
Strongly agree	42%	40%
Agree	52%	53%
Undecided	4%	3%
Disagree	1%	2%
Strongly disagree	1%	---
No response	---	2%
	100%	100%
B. The student participant brought new ideas and approaches to the research group.		
Strongly agree	6%	7%
Agree	40%	36%
Undecided	28%	26%
Disagree	19%	26%
Strongly disagree	5%	3%
No response	1%	2%
	100%	100%
C. The intellectual climate of the research group was strengthened by the presence of this student participant.		
Strongly agree	10%	12%
Agree	51%	43%
Undecided	22%	29%
Disagree	15%	12%
Strongly disagree	3%	2%
No response	---	2%
	100%	100%

(Continued)

TABLE 55. FACILITY RESEARCH PROGRAM BENEFITS FROM THE PARTICIPANT (Continued)

	1981 Response	1982 Response
D. The contributions of this student participant have resulted in additional publication(s) from the facility.		
Strongly agree	8%	3%
Agree	32%	36%
Undecided	34%	43%
Disagree	25%	16%
Strongly disagree	1%	---
No response	---	2%
	100%	100%

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 56. MAJOR VALUE OF PROGRAM:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Major Value of Program[a]	1981 Response[b]	1982 Response[c]
1. Provides the student with practical experience in a large research organization	36%	43%
2. Provides an understanding of what a research career in the student's chosen field would entail	17%	18%
3. The opportunity for interaction between professionals and students	9%	4%
4. Exposure to new techniques and equipment	6%	4%
5. The initial training of future scientists	6%	3%
6. Valuable assistance is provided to the research mentor	6%	12%
7. A chance for the student to explore the non-academic environment	5%	5%
8. Provides a meaningful learning experience for the student	5%	1%
9. Stimulates research mentors to explore new areas of research	4%	1%
10. Opportunity to teach on a one-to-one basis	3%	1%
11. Other	2%	5%
12. No response	4%	1%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 108 responses by 79 respondents.
[c]Represents 74 responses by 58 respondents.

NOTE: Columns may not add to 100% due to numerical rounding.

TABLE 57. SUGGESTIONS TO INCREASE PROGRAM EFFECTIVENESS:
Student Research Participation Program Evaluation
Research Mentor Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Suggestions to Increase Program Effectiveness[a]	1981 Response[b]	1982 Response[c]
1. Extend the length of the appointment or allow repetition in future summers	31%	18%
2. Identify research topics early in order to match them to student interests	16%	12%
3. Provide more participants	8%	6%
4. Provide research mentor with more information about the program and/or particular student assigned	8%	3%
5. Research mentor should have contact with student prior to his/her assignment	8%	18%
6. Arrange closer housing or aid students in locating housing	6%	12%
7. Screen mentors carefully	4%	3%
8. Expose students to more than one area of research	4%	3%
9. Place less emphasis on grades and more on overall qualifications	4%	3%
10. More advance notice to research mentor of student's acceptance	2%	15%
11. Increase advertisement of the program	---	3%
12. Other	8%	6%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.
[b]Represents 49 responses by 4 respondents. Thirty-five respondents had no suggestions.
[c]Represents 34 responses by 30 respondents. Twenty-eight respondents had no suggestions.

NOTE: Columns may not add to 100% due to numerical rounding.

1981 AND 1982 STUDENT RESEARCH PARTICIPANT
FOLLOW-UP SURVEY TABLES

TABLE 58. PUBLICATIONS AND SEMINARS RESULTING FROM PROGRAM PARTICIPATION:
Student Research Participation Program Evaluation
Follow-Up Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

	1981 Response	1982 Response
A. I am author, co-author, or my assistance has been acknowledged in a scientific publication.		
Yes	21%	30%
No	79%	70%
	100%	100%
B. I have presented a seminar.		
Yes	61%	50%
No	39%	50%
	100%	100%

TABLE 59. IMPACT OF PROGRAM ON CAREER GOALS:
Student Research Participation Program Evaluation
Follow-Up Questionnaire, 1981 and 1982

(1981 Respondents = 79)
(1982 Respondents = 58)

Impact of Program on Career Goals[a]	1981 Response	1982 Response
1. Intend to pursue a career in research	30%	13%
2. Intend to enter graduate school to study same subject areas as my program assignment	30%	53%
3. Changed my major to the subject area of my program assignment	15%	---
4. Increased educational/employment opportunities as a result of research experience	---	13%
5. Have accepted a position in a research laboratory	---	7%
6. Decided not to pursue a career in research	3%	10%
7. No response	21%	3%
TOTAL	100%	100%

[a]Categories of like responses to an open-ended survey question.

NOTE: Columns may not add to 100% due to numerical rounding.

APPENDIX A

SURVEY INSTRUMENTS

FACULTY RESEARCH PARTICIPATION PROGRAM EVALUATION
FACULTY PARTICIPANT - ENTRY

NAME: _____ UNIVERSITY/COLLEGE: _____

FACILITY: _____ DATES OF APPOINTMENT _____

FACILITY RESEARCH COLLABORATOR: _____ DATE: _____

In order to improve the operation of the Research Participation program and to better meet the needs of participants and DOE Laboratories, we ask you to respond briefly to these questions:

1. Please list in order of importance your objectives for participating in the faculty research participation program:

   A. _____
   B. _____
   C. _____

2. Have you participated in this or another similar research participation program before this appointment?

   Yes _____ No _____

   If Yes, give the name of the organization and briefly describe the experience:

   _____
   _____
   _____

3. Is your research project at the facility an expansion of present or past work of your own?

   Yes _____ No _____

4. How did you become aware of this program?

   A. "Bulletin board" literature
   B. Campus recruiter
   C. Former participant
   D. Head of my department
   E. journal
   F. Other (define) _____

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1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

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5. Did you receive support from your department head to proceed with this venture? 7. _____

   Yes _____ No _____

6. Did you know any of the members of the facility staff before applying for the program. 8. _____

   Yes _____ No _____

7. How many students (approximately) do you teach in an academic year? 9-11. _____ 12-14. _____

   Graduate _____ Undergraduate _____

8. Do you anticipate using facility equipment that you do not have access to on campus? 15. _____

   Yes _____ No _____

9. Do you anticipate that this experience will provide additional expertise that you do <u>not</u> now have? 16. _____

   Yes _____ No _____

10. Do you expect to contribute expertise that is <u>not</u> available at the facility? 17. _____

    Yes _____ No _____

11. Do you anticipate research collaboration with the DOE facility after your present appointment has expired? 18. _____

    Yes _____ No _____

FACULTY RESEARCH PARTICIPATION PROGRAM EVALUATION
FACULTY PARTICIPANT - EXIT

NAME: _____ UNIVERSITY/COLLEGE: _____

FACILITY: _____ DATES OF APPOINTMENT: _____

FACILITY RESEARCH COLLABORATOR _____ DATE: _____

In order to improve the operation of the Research Participation program and to better meet the needs of participants and DOE Laboratories, we ask you to respond briefly to these questions:

1. Research title: (Please write a brief summary of your research accomplishments-item #21.)

_____

_____

_____

2. Were you engaged in energy research prior to this appointment?

Yes _____ No _____

3. Do you intend to continue research in energy on campus?

Yes _____ No _____

4. Have you or do you expect to receive a grant or contract from the DOE facility for work on your campus?

Yes _____ No _____

5. Did you establish a research plan in consultation with your contact at the DOE facility prior to your appointment?

Yes _____ No _____

6. If so, was the plan followed?

Yes _____ NA (no plan) _____ No _____

Please elaborate: _____

_____

_____

7. Were the outcomes of this appointment consonant with your expectations?

Yes _____ No _____

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1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

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7. ____
8. ____
9. ____

8. How can the effectiveness of operation of this program be increased?

_____

_____

_____

_____

9. In your opinion, what is the major value of this program?

10. ____
11. ____
12. ____

_____

_____

_____

_____

Please answer the following group of questions by circling the number that corresponds to your degree of agreement or disagreement with each statement.

10. I have learned energy technologies unfamiliar to me prior to my participation in the program. 13. ___

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

11. I used equipment not available on campus. 14. ____

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

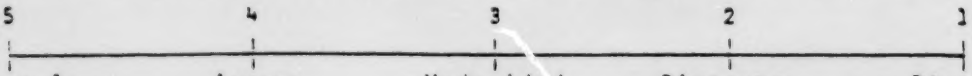
12. Being away from the university allowed me to accomplish more research than I would have if I had spent the time on campus. 15. ____

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

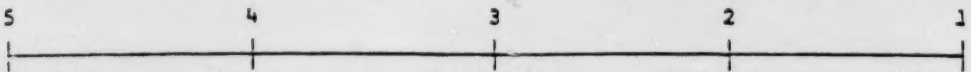
13. I recommend a similar experience for any interested graduate student 16. ____

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

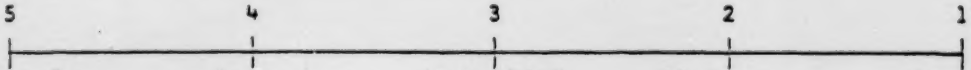
16. I intend to pursue additional research in the same general area. 17. ____



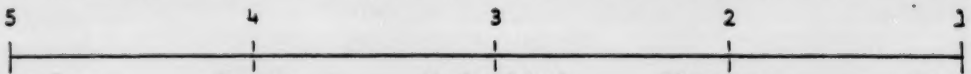
15. I recommend this program to other interested faculty members. 18. ____



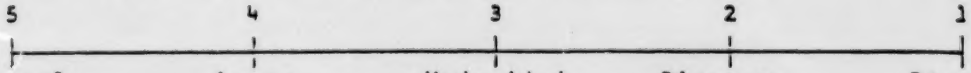
16. My original objectives were fulfilled in the course of the research experience. 19. ____



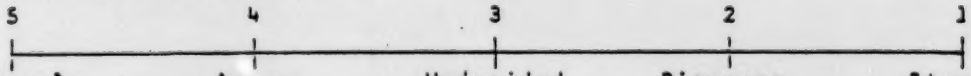
17. Interactions with the researchers at the facility were enriching. 20. ____



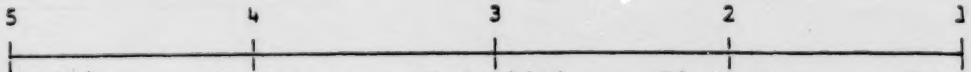
18. Funds provided for this program were adequate. 21. ____



19. Housing was satisfactory. 22. ____



20. The facility personnel were helpful during my orientation period. 23. ____



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21. Please write a brief summary of your research accomplishments:

FACULTY RESEARCH PARTICIPATION PROGRAM EVALUATION
RESEARCH COLLABORATOR - FOLLOW-UP

NAME: _____ CENTER: _____

FACULTY PARTICIPANT: _____ DATE: _____

DATES OF APPOINTMENT: _____ UNIVERSITY: _____

1. Title of participant's research:

_____

_____

_____

2. Title(s) of actual or planned publications based on participant's research: (Please include journal citations.)

_____

_____

_____

_____

3. Seminars or other presentations based on participant's research:

Title:	Date:	Occasion:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. Participant's accomplishments and contributions to ongoing work at the center.

_____

_____

_____

5. In your opinion, what is the major value of this program?

_____

_____

_____

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1-2. ____

3-4. ____

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6. How can the effectiveness of operation of this program be increased? 5-6. ____

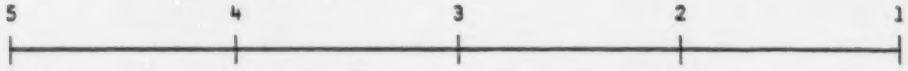
_____

_____

_____

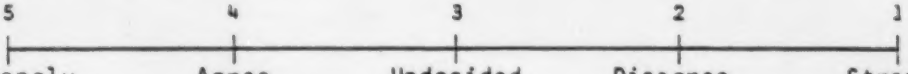
Please answer the following questions by circling the number that corresponds to your level of agreement or disagreement with each statement:

7. The research program at the facility has benefitted from contributions of this faculty member. 7. ____



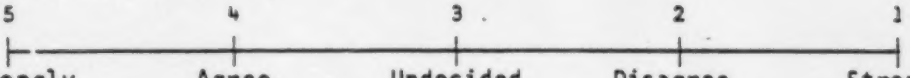
Strongly Agree — Agree — Undecided — Disagree — Strongly Disagree

8. I expect to continue collaborative association with this faculty participant. 8. ____



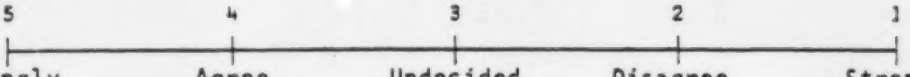
Strongly Agree — Agree — Undecided — Disagree — Strongly Disagree

9. The faculty participant brought creative ideas and approaches to the facility. 9. ____



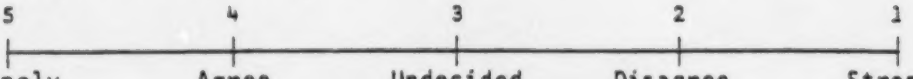
Strongly Agree — Agree — Undecided — Disagree — Strongly Disagree

10. The intellectual climate of the research group was strengthened by the presence of this faculty participant. 10. ____



Strongly Agree — Agree — Undecided — Disagree — Strongly Disagree

11. The faculty participant was trained in advanced energy technologies while at the facility. 11. ____



Strongly Agree — Agree — Undecided — Disagree — Strongly Disagree

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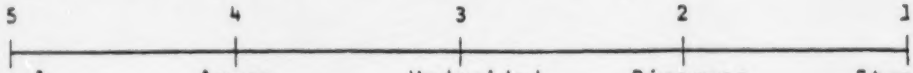
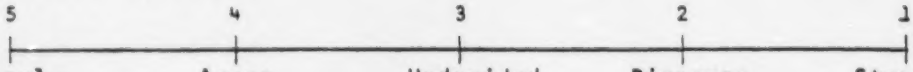
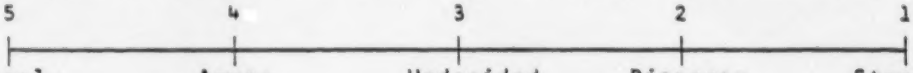
12. The contributions from this faculty participant will result in additional publication(s) from the facility. 12. ____



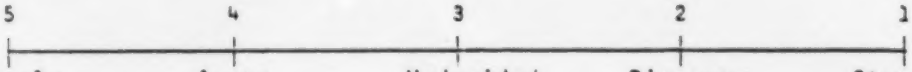
13. Faculty participants contribute to accomplishing the mission of the facility. 13. ____



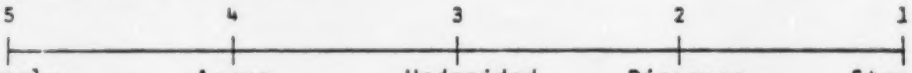
14. The rapport between this facility and the faculty member's university has been expanded as a result of his/her participation. 14. ____



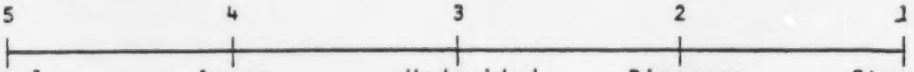
15. My experience of being a research collaborator was a rewarding one. 15. ____



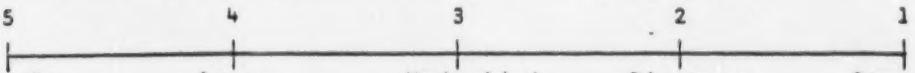
16. I have gained new knowledge as a result of collaboration with this faculty member. 16. ____



17. I feel this faculty participant could be a useful contractor for DOE. 17. ____



18. I am willing to supervise another faculty member. 18. ____



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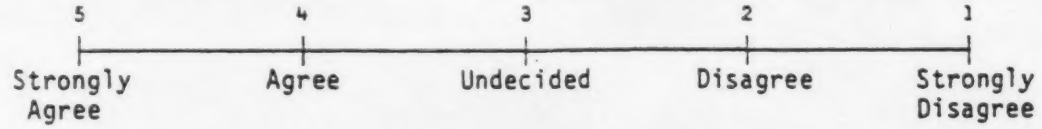
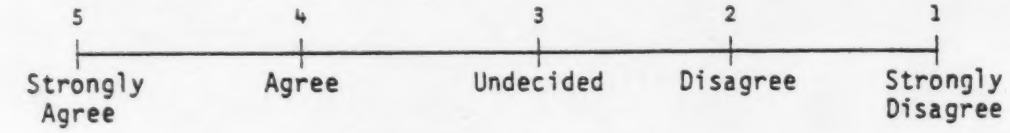
19. My research has moved much faster with the aid of the faculty participant than it would have without his/her assistance. 19. ____



20. The faculty participant contributed expertise that is <u>not</u> available at the facility. 20. ____



21. Have you or do you intend to give the participant a grant or contract to continue his/her research? 21. ____

Yes _____ No _____

Complete and return form to:

Oak Ridge Associated Universities
University Programs
Faculty Research Participation Program
P.O. Box 117
Oak Ridge, TN 37830
(615)576-3424
FTS 626-3424

FACULTY RESEARCH PARTICIPATION PROGRAM EVALUATION
FACULTY PARTICIPANT - FOLLOW-UP

NAME: _____ UNIVERSITY/COLLEGE: _____

FACILITY: _____ DATES OF APPOINTMENT: _____

FACILITY RESEARCH COLLABORATOR: _____ DATE: _____

In order to improve the operation of the Research Participation program and to better meet the needs of participants and DOE Laboratories, we ask you to respond briefly to these questions:

1. Research title: _____

_____

2. Title(s) of actual or planned publications based on your research: (Please include journal citations)

_____

_____

_____

_____

3. Seminars or other presentations based on your research:

Title:	Date:	Occation:
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please answer the following group of questions by circling the number that corresponds to your degree of agreement or disagreement with each statement.

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1. _____

4. I have or will incorporate knowledge gained from my participation in the program into my teachings.

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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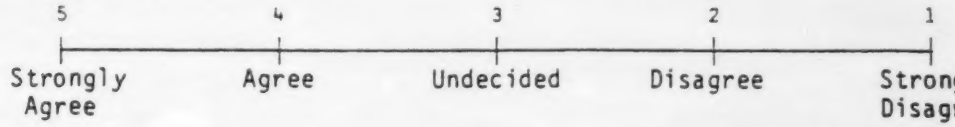
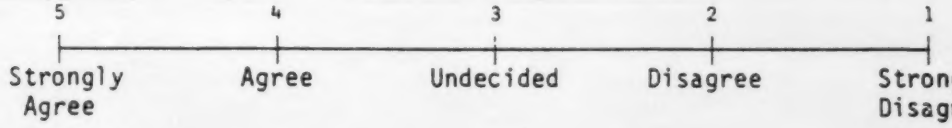
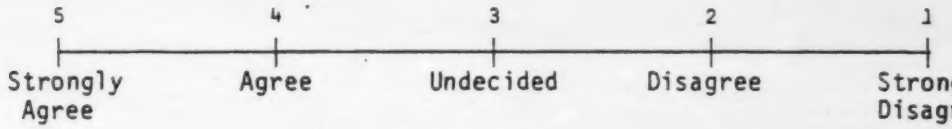
5. I plan to offer a new course(s) based on knowledge gained from my participation. 2. _____



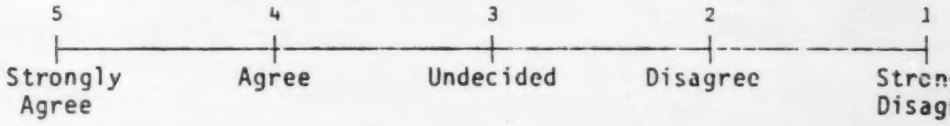
6. As a result of this experience I am better prepared to direct student research in related areas. 3. _____



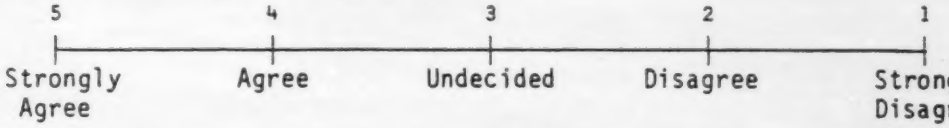
7. I have or will originate a new research program related to my research at the DOE facility. 4. _____



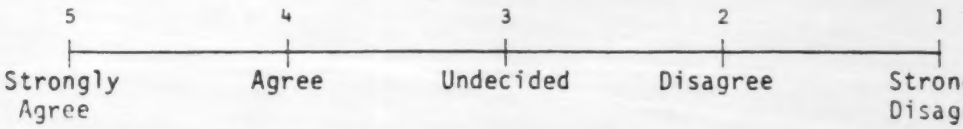
8. I have maintained contact with the facility since I returned to campus. 5. _____



9. I am now or intend to continue collaborating with the facility on the research conducted while there. 6. _____



10. The research conducted during this appointment will be of value in preparing grant proposals. 7. _____



11. Have you submitted grant proposals as a result of your research with DOE, 8. _____

Yes _____ No _____

If so, to what agency(ies)?

_____

_____

STUDENT RESEARCH PARTICIPATION PROGRAM EVALUATION
STUDENT PARTICIPANT – ENTRY

Facility: _____ Date: _____

In order to improve the operation of the research participation program and to better meet the needs of participants and DOE laboratories, we ask you to respond briefly to these questions

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1. Please list (in order of importance) your objectives for participating in the Student Research Participation program

   A. _____ 1. _____

   B. _____ 2. _____

   C. _____ 3. _____

2. How did you become aware of this program 4. _____

   A. "bulletin board" literature
   B. campus recruiter
   C. former participant
   D. head of my department
   E. major professor
   F. journal
   G. other (define) _____

3. Did you talk to a fellow student or faculty member who had participated in this program previously? 5. _____

   Yes _____ No _____

4. Did you know any members of the facility staff before being selected for the program? 6. _____

   Yes _____ No _____

5. Have you had any communication with your research mentor as to the nature of the research that you will be conducting? 7. _____

   Yes _____ No _____

6. Were a specific work plan and reading references provided to you by your research mentor in advance of the starting date? 8. _____

   Yes _____ No _____

7. The area of research for which you were chosen was your 9. _____

   First choice _____ Second choice _____ Other _____

8. What areas of expertise, that you presently do not have, do you anticipate receiving from this research experience?

   _____ 10. _____

   _____ 11. _____

   _____ 12. _____

   _____

Return form to University Programs Division, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, Tennessee 37831, Telephone 615-576-3426

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STUDENT RESEARCH PARTICIPATION PROGRAM EVALUATION
STUDENT PARTICIPANT – EXIT

Name _____ Date _____

University/college _____ Facility _____

Dates of appointment _____ Research Mentor _____

In order to improve the operation of the research participation program and to better meet the needs of participants and DOE facilities, we ask you to respond briefly to these questions

1. How can the effectiveness of operation of this program be increased?

_____

_____

_____

2. In your opinion, what is the major value of this program?

_____

_____

_____

3. After graduating from college I intend to

_____ A. Go to graduate school in an energy-related area
_____ B. Go to graduate school in a non-energy-related area
_____ C. Go to medical (or other professional) school
_____ D. Begin a career in an energy-related area
_____ E. Begin a career in a non-energy-related area
_____ F. Other (define) _____

4. The highest degree I expect to receive is

_____ A. Ph.D.
_____ B. M.D.
_____ C. M.S.
_____ D. B.S./B.A.
_____ E. Other (define) _____

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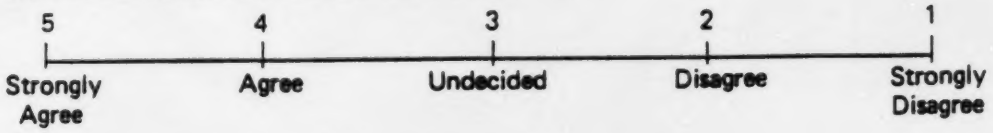
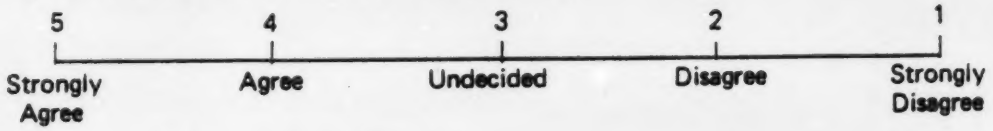
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Please answer the following group of questions by circling the number that corresponds to your degree of agreement or disagreement with each statement.

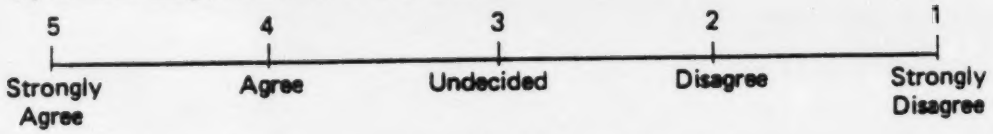
5. My research assignment was valuable to me.



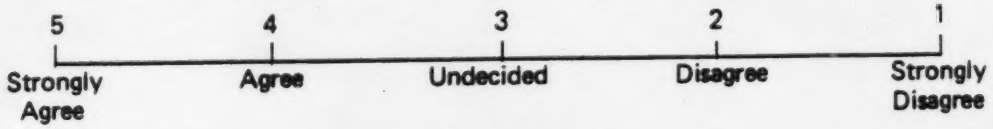
6. My research assignment exceeded my expectations.



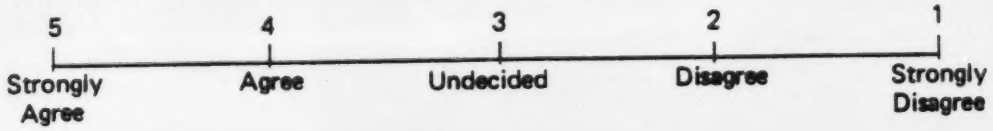
7. My research assignment matched my interest.



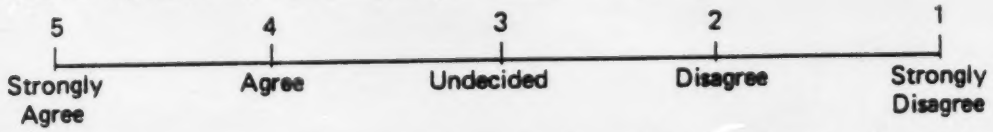
8. The content of my assignment was investigative and challenging.



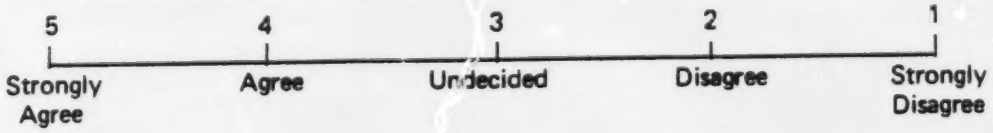
9. The content of my assignment was just a job and at times boring.



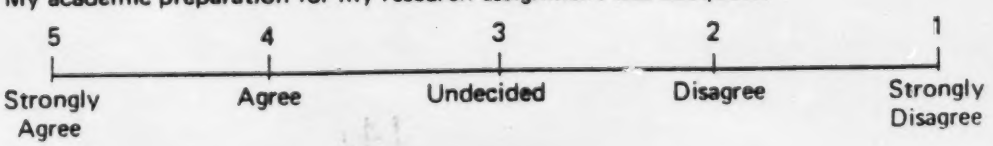
10. Prior to my arrival my research supervisor had contacted me.



11. Research supervisors should contact students and provide them with written material about their research prior to their arrival.



12. My academic preparation for my research assignment was adequate.



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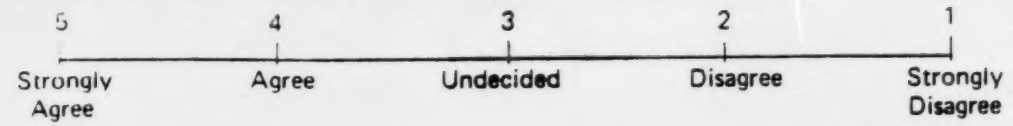
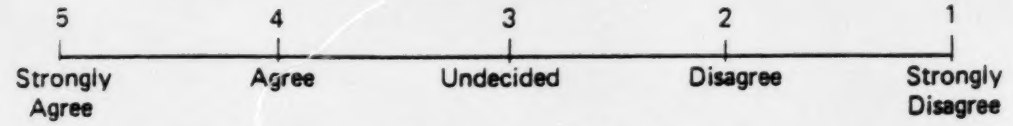
9. ____
10. ____
11. ____
12. ____
13. ____
14. ____
15. ____
16. ____

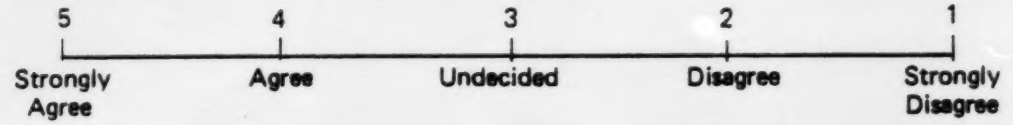
13. My supervisor in the laboratory was available to guide or assist me.



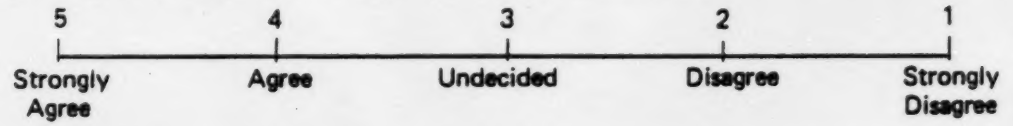
14. The orientation session was beneficial and interesting.



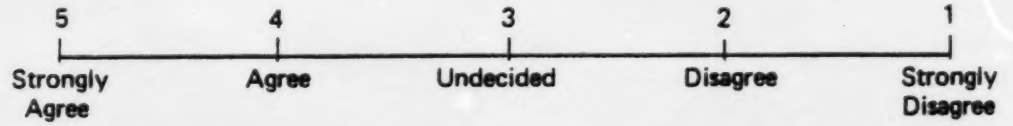
15. The equipment and information at my disposal were adequate to carry out my research assignment.



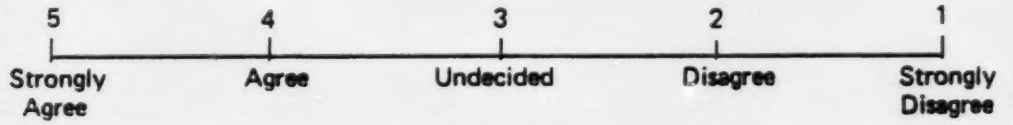
16. Housing for an appointee is a major drawback to acceptance.



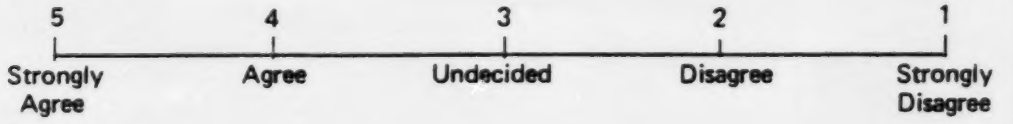
17. Housing for an appointee is no more difficult than one would expect for the average short-term stay in a new location.



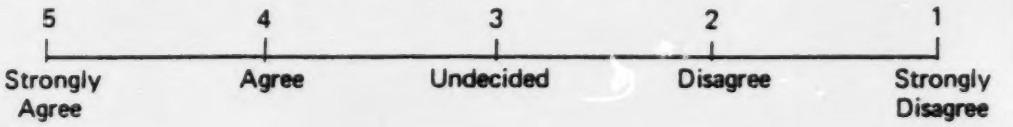
18. Advance communications from ORAU about housing were frank from the beginning of the offer.



19. Advance communications from ORAU about housing minimized problems actually encountered.



20. Transportation was less of a problem than I anticipated.



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17. ____

18. ____

19. ____

20. ____

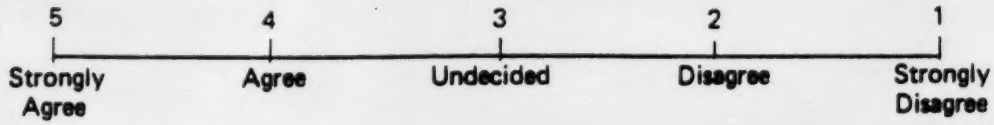
21. ____

22. ____

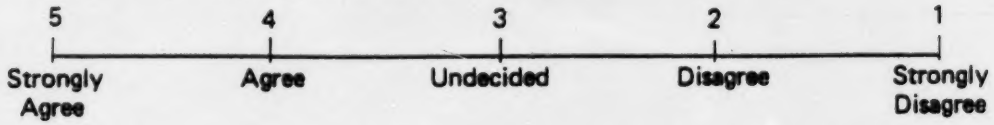
23. ____

24. ____

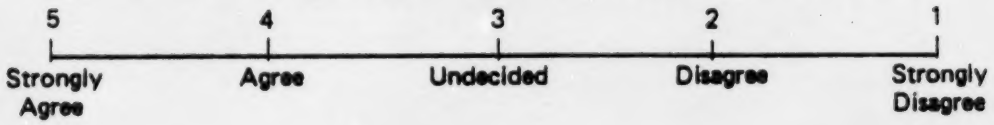
21. As a result of my training, I received in-depth background for a major senior year course or an honors course or paper.



22. My assignment increased my desire to go to graduate school.



23. As a result of my participation in this program I may consider a career with DOE.



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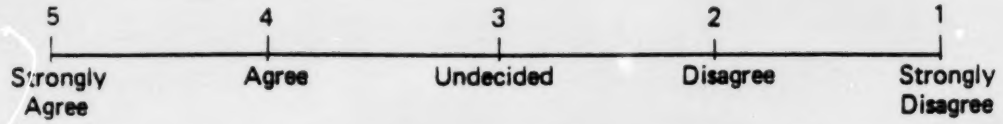
25. _____

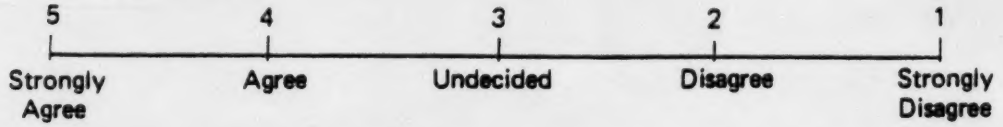
26. _____

27. _____

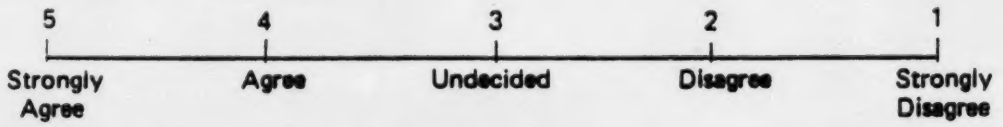
24. The housing arrangement with The University of Tennessee presented attentive and cooperative management personnel.



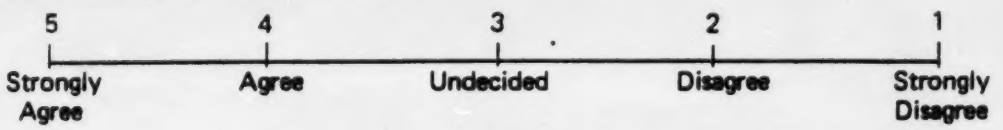
25. The housing arrangement with The University of Tennessee afforded efficient and comfortable facilities.



26. The housing arrangement with The University of Tennessee offered valuable social benefits for the individual.



27. The housing arrangement with The University of Tennessee included significant advantages derived from the campus.



Return form to University Programs Division, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, Tennessee 37831, Telephone 615-576-3426, FTS 626-3426

(6/83)

STUDENT RESEARCH PARTICIPATION PROGRAM
RESEARCH MENTOR – EXIT

Name _____ Facility _____

Student participant _____ University/college _____

Dates of appointment _____ Date _____

In order to improve the operation of the research participation program and to better meet the needs of participants and DOE facilities, we ask you to respond briefly to these questions

1. Title of student's research project:

   _____

   _____

2. Please cite publications or reports resulting from the student's research:

   _____

   _____

   _____

3. How long in advance did you know that a student would be assigned to you?

   _____

4. Was a copy of the student's file available to you in advance?

   Yes _____ No _____

5. Did you write or talk to the student in advance about the nature or content of possible research participation assignments?

   Yes _____ No _____

6. Why did you select this student?

   _____

   _____

   _____

7. Were a specific topic of work planned and reading references provided in advance of the starting date?

   Yes _____ No _____

8. Was the quality of the participant consistent with your expectations as judged by the application?

   Yes _____ No _____

9. Have you supervised other participants?

   Yes _____ No _____

10. If yes, how did the quality of the work of this student compare with work done by others?

    Superior _____ Average _____ Poor _____

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1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

11. Was it clear to you as to what your role as a research mentor entailed?

Yes _____ No _____

12. Was the general information you received about the Student Research Participation Program adequate?

Yes _____ No _____

13. Do you know whether the research experience had any influence on the student's attitude toward research or his/her career objectives?

Yes _____ No _____

14. If so, please elaborate on effects of the experience.

_____

_____

_____

_____

15. What did the student gain from the research experience in your facility?

_____

_____

_____

_____

16. What effect has this program had on you, your regular personnel, or your facility in general?

_____

_____

_____

_____

17. How would you rate the participant's performance on the assignment?

_____ Superior
_____ Above Average
_____ Average
_____ Below Average
_____ Poor

18. In your opinion, what is the major value of this program?

_____

_____

_____

_____

19. How can the effectiveness of operation of this program be increased?

_____

_____

_____

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11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____

Please answer the following questions by circling the number that corresponds to your level of agreement or disagreement with each statement.

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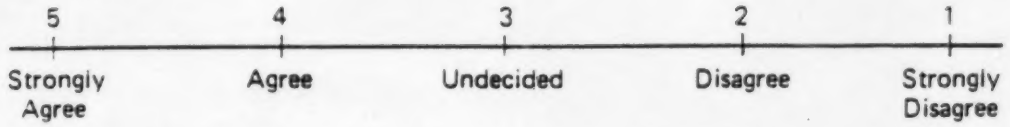
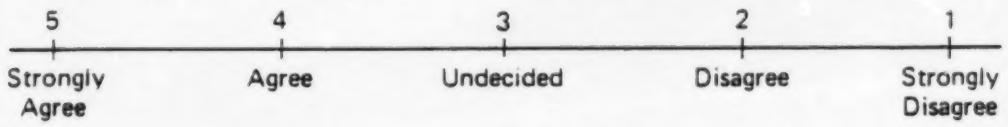
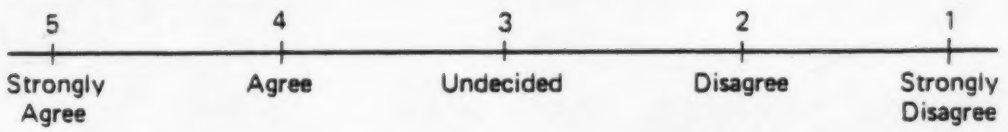
20. The research program at the facility has benefitted from contributions of this student participant. 29. _____



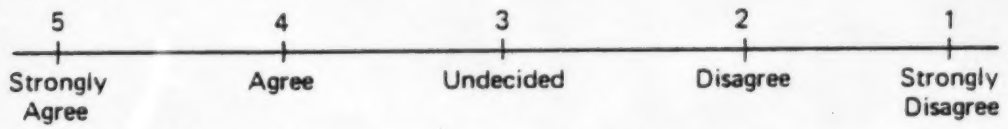
21. The student participant brought new ideas and approaches to the research group. 30. _____



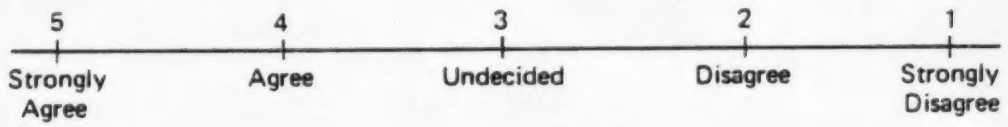
22. The intellectual climate of the research group was strengthened by the presence of this student participant. 31. _____



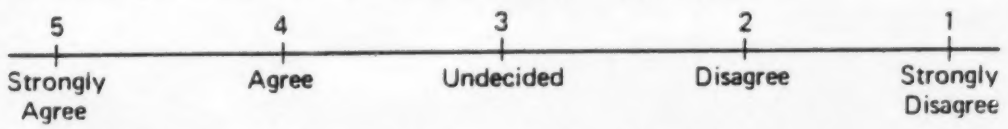
23. The student participant was trained in advanced energy technologies while at the facility. 32. _____



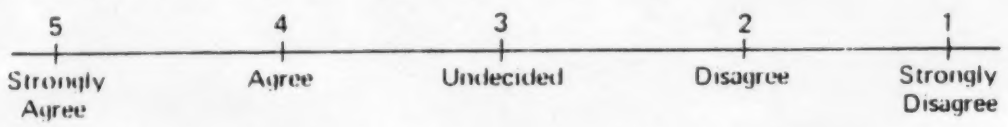
24. The contributions from this student participant have resulted in additional publication(s) from the facility. 33. _____



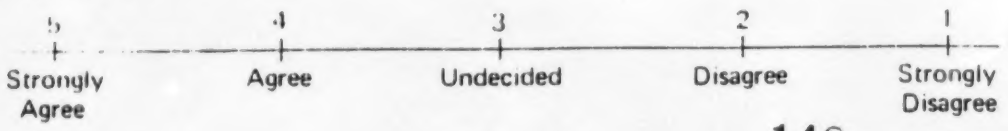
25. My experience of being a research mentor was a rewarding one. 34. _____



26. I have gained new teaching skills as a result of supervising this student. 35. _____



27. I have gained experience in dealing with personnel as a result of this supervisory experience. 36. _____



28. My research has moved faster with the aid of this student than it would have without his/her assistance.

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

29. I would be willing to supervise another student participant in the future.

5	4	3	2	1
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

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37. _____

38. _____

Return form to University Programs Division, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge,

Student Research Participation
Program Evaluation
Student Participant - Follow-up

OAK RIDGE
ASSOCIATED UNIVERSITIES

UNIVERSITY
PROGRAMS

As a result of my participation in the Student Research Participation program:

1. I am author of/coauthor of/my assistance has been acknowledged in/a scientific publication.

   Authors:
   Title:
   Journal Name:
   Volume:
   Pages:
   Date:

2. I have presented a seminar.

   Title:
   Date:
   Location:

3. My career goals have been affected. Please detail in what way.

_____

_____

_____

_____

NAME: _____

_____

APPENDIX B
1981/1982 FACULTY RESEARCH PARTICIPANTS PUBLICATIONS

APPENDIX B

1981/1982 Faculty Research Participants Publications

Averill, Frank Wallace. "Virial Theorem in the Density Functional Formalism: Forces in H_2." Physical Review, No. B23 (December 1981).

*Avery, James F. "Mathematical Modeling of Transient Processes in Fluidized Bed Combustion." Morgantown Energy Technology Center IR, No. 1076 (July 1981).

*Bittner, Edward W. "Relative Rates for Hydrogen Donation to Benzyl Radical." American Chemical Society Division of Environmental Chemistry Preprints of Papers, Vol. 27, No. 3 (1982): 17.

*_____. "Relative Activity of Hydrogen Donors in Coal Liquefaction." International Conference on Coal Science Preprints. Pittsburgh, PA: 1983.

*Dalal, Nar S. "C^{13}-$_1$H NMR and EPR Characterization of Alkyl-Benzene Sulfonates in Relation to Enhanced Oil Recovery." Morgantown Energy Technology Center Report (August 1981).

*_____. "K_3CrO_8: A New Standard for Fossil Fuels." Analytical Chemistry, No. 53 (1981): 939.

Fries. L. C., Sauers, I., Ellis, H. W., and Christophorou, L. G. "Observation of Ions from a Spark Discharge in SF_6." Chemical Physics Letters, No. 81 (1981): 528-532.

_____. "Positive Ions in Spark Breakdown of SF_6." Journal of Physics D: Applied Physics, Vol. 14 (1981): 1629-1642.

_____. "Positive Ions Observed in Sparked SF_6 and SF_6--Continuing Mixtures at 40 k Pa." Proceedings of the 29th Annual Conference on Mass Spectrometry and Allied Topics. (1981): 144-145.

Hayden, T. L.; Turner, J. E.; Williams, N. W.; and Cook, J. S. "A Model for Cadmium Transport and Distribution in CHo Cells." Computers and Biomedical Research. 1982.

Irwin, Caulton L. "Sensitivity Analysis of Chemical Equilibrium." Morgantown Energy Technology Center Report. 1982.

*Knickle, Harold N.; et al. "Backmixing and Heat Transfer Coefficients in Bubble Columns Using Aqueous Glycerol Solutions." 21st ASME/ATCHE National Heat Transfer Conference Proceedings. 1983.

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*Indicates participants assigned to the Fossil Energy Research Centers.

Information was taken from forms provided by participants and may not be complete.

Lee, James M. "Properties and Application of Immobolized B-D-Gluosidase Co-Entrapped with Zymomonas Mobilis in Calcium Alginate." Biotechnology and Bioengineering. 1983.

Leming, Charles W. "Innovative Mining Technology." CMTC HSMD LR-81-2. 1981.

*Li, Ching-Chung; et al. "Shape Description of Coal Particle Contours through Elliptical Approximation." Particulate Science and Technology. New York: Chemical Publishing Co., Inc. 1983.

MacKillan, Alan D. "One Dependence of the Optical Potential: Application to the ^{32}S + n Reaction Using Coupled Channels." Physical Review C: Nuclear Physics. July 1983.

*Obermyer, Richard T. "Magnetic, Mossbauer, and Catalytic Properties of the Zerolite Catalyst ZSM-5 (Fe)." Journal of Applied Physics. 1982.

*_____. "Promotion and Characterization of Zeolitic Catalysts Used in the Synthesis of Hydrocarbons From Syngas." CS Symposium Series. 1983.

*Obermyer, R. T.; Rao, V. U. S.; Gormley, R. J.; and Schneider, L. C. "Synthesis Gas Conversion to Gasoline Range Hydrocarbons Over Zeolite Catalysts Containing Group VIII Metals and Bimetallics." American Chemical Society Division of Fuel Chemistry Preprints, No. 25 (1980): 119.

*Obermyer, R. T.; Lo, Cary; Rao, K. R. P. M.; Mulay, L. N.; Rao, V. U. S., and Gormley, R. G. "Mossbauer and Magnetic Studies on Bifunctional Medium Pore Zeolite-Fe Catalysts Used in Synthesis Gas Conversion." Recent Chemical Applications of Mossbauer Spectroscopy (Advanced in Chemistry Series). 1981.

Pachico-Santiago, Nelson. "A Simplified Solar System Design Technique for Tropical Regions." Proceedings of the 4th Annual American Society of Mechanical Engineers Solar Energy Conference. 1982.

*Rhee, K. H.; et al. "Dual Cobalt Speciation in Co/ZSM-5 Catalysts." Journal of Catalysis. 1983.

*Robbat, Albert. "Investigation of the Nature of Titanium in Coal Liquids." Proceedings of Pittsburgh Conference. (1982): 122.

Sauers, I; Christophorou, L. G.; Frees. L. C.; and Ellis, H. W. "Aspects of Environmental Effects of Dielectric Gases." Gaseous Dielectrics II: Proceedings of the Second International Symposium on Gaseous Dielectrics, Knoxville, TN, March 1980. New York: Pergamon Press, 1980.

*Saxena, Satish C. "Recent Developments in Granular Bed Filters." Morgantown Energy Technology Center Report. 1981.

*_____. "Technology Assessment of Particular Removal from High Temperature and High Pressure Combustion Gases." Argonne National Laboratory. 1982.

Scogin, Ron Lynn. "Biochemical Aspects of Plant/Animal Interaction in a Tropical Rain Forest." Bulletin of Rancho Santa Ana Botanical Gardens. 1982.

Vermillion, Everett and Richards, R. K. "Ion Confinement Times in EBT-S." Bulletin of the American Physics Society. September 1981.

_____. "EBT Power Loss by Dielectronic Recombination of Aluminum." EBT-S Technical Memo #12. 1982.

Proposed Publications

*Al-Saadoon, Faleh T. "Coalbed Methane Resource Estimate of the Piciance Basin."

Averill, Frank Wallace. "Augmented Gaussian Orbital Approach to Self-Consistent Cluster Calculations, Application to Cu_2."

_____. "Bonding in the First Row Dimmers within the Local Density Approximation."

Berman, Stephen. "Low-Level Structure Over Complex Terrain."

*Bittner, Edward W. "Relative Rate Constants of Hydrogen Transfer to Benzyl Radical."

*_____. "Relative Rate Studies of Model Hydrogen Donor Compounds."

*_____. "Relative Rates of Hydrogen Abstraction by Benzyl Radical."

Bradley, Daniel Joseph. "The Heat of Solution of Methanol in Water at High Temperatures and Pressures."

*Chin, Pao Kuo. "Heavy-Metal Mobility Due to Acid Rain and its Environmental Impacts: A Literature Review."

*Dalal, Nar S. "^{13}C NMR Characterization of Linear Alkyl Benzene Sulfonate Used in Aqueous Chemical Flooding."

*Dalal, Nar S.; et al. "Applications of ^{13}C-NMR to Enhanced Oil Recovery."

Davis, George J. "Assessment of Linear Dependencies in Multivariate Data."

Gormley, R. J. Rao, V. U. S.; Obermyer, R. T.; Pennline, H. W.; Schehl, R. R.; and Youngblood, A. J. "Influence of Bimetallics in ZSM-5 (Fe, Co) Catalysts in the Product Selectivity of Synthesis Gas Conversion."

Gross, Louis J. and Chabot, B. F. "Effects of Light Data Expression in Calculating Leaf Carbon Balances."

Gross, Louis J. and Hutchison, B. "A Note on the Architecture of an East Tennessee Deciduous Forest Canopy."

*Irwin, Caulton L. "Sensitivity Analysis and Tentative Solution Methods."

*_____. "Sensitivity Analysis of Reaction Diffusion Systems."

*Kilkis, Berol. "Prediction of Local Heat Transfer across the Fluidized Bed Walls."

Lu, Hsi-Nan. "Comparisons and Evaluations on Various Models for Plume Deposition and Sedimentation."

Lee, James M. "The Inhibition of B-D-Glucosidase by a Factor in Commercial Yeast Extract."

*Maguire, Mildred M. "O^{17} Nuclear Magnetic Resonance of Coal Liquefaction Products."

*Mallik, Anys K. "Computerized Cost Comparison of Industrial Boilers."

*_____. "Computerized Cost Effectiveness Model for Energy Production Systems under Inflationary Environment."

McDermott, Christine. "Antibody-Dependent Cell-Mediated Cytotoxicity as a Possible Mechanism of Idiopathic Autoimmune Thrombocytopenia in Humans and Non-Human Primates."

*Moore, L. Ted. "Life Cycle Costing Consequences of PM Programs."

*_____. "Practical Aspects of Availability Planning."

*Moseley, James L. "Implementation of the JAYCORE Model for Agglomeration."

*Pierce, James. "The Fate of Electrochemically Generated Free Radicals in Some Coal Derived Liquids."

*Rhee, K. H. "Infrared Studies of $M(Co)_x$-Impregnated ZSM-5."

*Rhee, K. H.; et al. "Infrared Studies on the Acidity of Metal-Impregnated ZSM-5."

*_____. "Supported Transition Metal Compounds: Infrared Studies on the Acidity of Co/ZSM-5 and Fe/ZSM-5 Catalysts."

*_____. "Metal Zeolite Catalysts for the Conversion of Synthetic Gas to Selected Hydrocarbon Products."

*Robbat, Albert. "Evaluation of a Thermoionic Ionization Detector for Detection of Nitrated Aromatic Hydrocarbons."

*_____."On the Existence and Importance of Organic Titanium in Coal Conversion."

*_____."Retention Characteristics of Nitrated Aromatic Hydrocarbons on SE-52."

*Rollnski, Edmund J. "Wet Air Oxidation Studies of Coal Gasification Wastewaters."

*Saxena, Satish C. "Technology Status of Particulate Removal."

*St. John, Robert M. "Sensitivity Measurement of a Field Ionization Source Mass Spectrometer."

Sauers, I.; Ellis, H. W.; Fries, L. C.; and Christophorou, L. G. "Detection of SF_4 in Sparked SF_6."

Sepaniak, Michael J. "Laser Fluorometric Detection for Open Tubular Capillary Liquid Chromatography."

Vermillion, Everett. "Doppler Broadening Due to Cyclotron Motion in a Uniform Magnetic Field."

*Volker, Eugene J. and Bockrath, Bradley. "Effect of Cresol as a Co-Solvent for Coal Liquefaction."

Willig, Michael R. "Decomposition Rates in the Luguillo Experimental Forest: A Statistical Analysis."

_____. "Food Preference in the Puerto Rican Ruddy Quail Dove."

_____. "Population Biology of Lamponius Portoricensis."

Zehr, Floyd J. "The Performance and Economics of Superinsulated Houses."